REPORT OF

CHEMICAL SURVEY OF THE WATERS OF ILLINOIS

UNIVERSITY OF ILLINOIS

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CHEMICAL SURVEY

OF THE

WATERS OF ILLINOIS.

REPORT FOR THE YEARS 1897-1902

BY

ARTHUR WILLIAM PALMER, Sc.D.,
PROFESSOR OF CHEMISTRY.

Published by the University, under an act of the General Assembly of the State of Illinois entitled, "An act to establish a chemical survey of the waters of the State of Illinois," approved June 7th, 1897; in force July 1st, 1897.

CORRECTIONS.

Page 76, line 19, for "40,000 car loads of corn annually," read 30,000 car loads of 40,000 pounds of corn each annually.

Page xvi, appendix, line 5, read, at Pekin and Peoria from 40,000 to 50,000 head of cattle were formerly fed upon distillery slops, but the number has lately been reduced and now amounts to but 18,000 head annually.

CONTENTS.

That portion of the report, referred to upon page 6, which relates to the mineral waters of the state will be published separately.

CHEMISTRY BUILDING, UNIVERSITY OF ILLINOIS.

REPORT OF THE CHEMICAL SURVEY

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WATERS OF ILLINOIS

Andrew Sloan Draper, LL. D.,
President of the University of Illinois.

SIR:—Herewith I submit a report of the work of the Chemical Survey of the Water Supplies of Illinois, covering the years 1897 to 1902, inclusive. As was stated in my preliminary report, published in 1897, portions of which are incorporated in the present report, the aims of the survey include the determination of the present sanitary condition of the water supplies drawn from the lakes, the streams, and the wells of the State; the determination of the normal condition of uncontaminated waters; the formulation of local standards of purity based upon the results of analyses of water derived from unpolluted sources; the provision of such means as shall afford to citizens of the State opportunity to obtain immediate information regarding the wholesomeness of the potable waters in which they are directly interested; and in general the prevention of the development and dissemination of disease from the use of impure water.

The press of work in certain of these directions has been so great that comparatively little has been accomplished in others, and a mass of data concerning the normal condition of ground waters must be left for digestion and discussion at some future time.

The present report may be broadly divided into three parts, namely:

1. A brief consideration of the sanitary condition of the ordinary ground waters and matters relating thereto. Accompanying this there is a paper upon "The Geology of Illinois as Related to Water Supplies," by Charles W. Rolfe, Professor of Geology in the University.

2. Results of the mineral analysis of some four hundred and sixty samples of water mainly from wells of considerable depth.

3. A report of the investigation of the surface waters of the State, relating chiefly to the Illinois River and some of its tributaries.

Most of the routine work of these investigations has been conducted by Mr. C. V. Millar, M. S., and Mr. R. W. Stark, B. S., to whom special commendation is due for the continued interest, the skill and the unfailing zeal with which they have furthered the purposes of the Survey. At various times we have further been ably assisted by Mr. F. C. Koch, M. S.; Mr. E. P. Walters, B. S.; Mr. A. D. Emmett, B. S.; and Mr. A. L. Marsh.

Respectfully submitted,

ARTHUR W. PALMER, Sc. D.,
Professor of Chemistry.

THE WATER SUPPLIES OF ILLINOIS.

The available sources of water supply in this State are practically limited to rain water, low land surface water furnished by streams and lakes, and ground waters obtained from wells of greater or less depth.

The water derived from each of these sources differs widely in character from those derived from the others, and again within each of these classes, including even the first, there are found the widest variations in character and quality, the result usually of local conditions.

Approximately one-half of the inhabitants of the State, including the citizens of Chicago and those of certain of the larger towns, drink surface waters drawn from Lake Michigan or from various streams. The other half, including the people of the smaller towns and the rural districts, drink water drawn from wells, some of which derive their supply from rock strata, but of which by far the greater mumber are supplied with water from the earth deposits overlying the rock, which deposits cover almost the entire surface of the State, range in thickness from a few feet up to two hundred and fifty feet or more and consist chiefly of glacial detritus or drift.

In certain localities, particularly in the extreme northwestern section and in the southern extremity of the State, where ground waters are in general not easily obtainable, rain water is quite extensively used for drink, but elsewhere in Illinois it is rarely used for this purpose, although by the exercise of care in its collection and preservation, it would be found far more satisfactory and wholesome than the ground waters and surface waters which are usually drank.

RAIN WATER, if caught in its original condition and properly preserved, doubtless constitutes the purest water which nature affords. Pure rain water, however, is but rarely obtained, because the care and attention requisite in order to collect it in uncontaminated condition are not often devoted to the purpose, nor even generally recognized as really necessary.

Rain in falling to the earth washes from the air some or all of the various impurities which the atmosphere contains, so that the water precipitated during the forepart of a rain storm usually contains considerable quantities of foreign substances, both mineral and organic. In addition to the objectionable gases emanating from fires, from manufacturing establishments, from decomposing refuse matters, etc., the impurities include numerous solid substances of which the most important are soot, dust from the fields, roadways, etc., and various sorts of germs. Furthermore, the roofs which serve as collecting surfaces are usually soiled with soot, dust blown from the roadways, the excrement of birds, decaying leaves, etc. Ordinarily no serious effort is made to prevent these matters from entering the cistern, but commonly the cistern is provided with a filter wall of soft brick, which is expected to remove from the water substances which ought never to be contained in that water which is allowed to enter the cistern.

The ordinary cistern filter, as commonly managed or rather neglected, frequently is almost worse than useless, inasmuch as it soon becomes surcharged with the matters which it has removed from some of the water, and then instead of purifying the water which subsequently passes through, often becomes a source of offence if not of danger.

The rain water which is collected during the latter part of a shower, after the air and roof have been thoroughly washed, is comparatively pure; nevertheless it still contains small quantities of foreign substances which may accumulate and may become a menace to health, unless the cistern, and especially the filter, be kept scrupulously clean.

The rain pipes of most residences are nowadays provided with cut-off valves which enable one to reject the first washings of the atmosphere and the roofs, but these valves are generally left in a condition which may perhaps appropriately be designated as a state of noxious desuetude.

SURFACE WATERS: In general, water taken from lakes, from streams or from the ground, when these sources of supply are in their original or natural condition, is perfectly wholesome and unobjectionable; but with increasing population and longer occupancy of the ground, the conditions change and contamination becomes inevitable.

Our water courses are natural drainage channels; they of necessity receive the drainage of all towns and villages and dwelling places situated within their respective water shed areas, so that nearly if not quite all of our streams now contain sewage.

But the dangerous impurities contained in the waters of our streams come by no means wholly from the discharge of sewage into them.

The surface wash carried into our water courses by the "run off," *i. e.,* that portion of the fallen rain which flows over the surface of the ground directly into streams and lakes, periodically introduces more organic matters into these sources of water supply than does sewage.

Moreover, these organic matters, including as they do, the periodic storm washings of the streets and alleys, of barn yards and pig pens, of slaughter house surroundings and garbage dumps, and the by no means less objectionable slops and other refuse which an inattentive public throws or permits to be thrown almost anywhere and nearly everywhere except in the front yard, constitute fully as dangerous a source of pollution as do the organic matters of sewage itself, notwithstanding the fact that the organic matters conveyed to streams by the run-off consist very largely of substances of vegetable origin, which are far less easily susceptible to that class of agencies which quickly occasion the putrefactive and other decompositions of the animal wastes which constitute the more characteristic components of ordinary sewage.

The organic matters from all or any of these sources go partly into solution in the water, but are for a time at least held mainly in suspension and (together with suspended mineral matters) impart to the water a disagreeable turbid appearance; they soon begin to undergo decomposition if indeed they are not already in an active state of putrefaction when they enter the water, and in consequence of these changes, odors and tastes develop which are offensive to the senses and detrimental to health. However, the particular danger encountered in the use of sewage laden waters for drink lies not in the action of the dead organic wastes, which constitute by far the greater part of the impurities, or the ordinary products of their decomposition, but in the presence of those minute living organisms which either themselves or through the products of their vital activities, the toxines, etc., are the specific causes of disease. As the fresh sewage of a town is probably never free from disease germs, it is fortunate that the conditions prevailing in such bodies of water as are available for water supply are not favorable to the growth and multiplication of the disease germs which are contributed to sewage by fecal discharges. Consequently the disease germs once introduced into such waters through pollution by sewage do not increase, but, either through the lack of the proper food or the absence of other necessary conditions, or, because in the struggle for existence they are crowded out by the hardy and harmless bacteria which find their natural habitat in surface waters, they gradually die and in course of at most a few weeks disappear entirely.

Since the disease germs do not under these conditions thrive and multiply, but on the contrary soon become extinct, the danger attending the use of such waters for drink is dependent upon the introduction of fresh supplies and is ever present because of the continual inflow of germ-laden sewage.

But dejecta containing disease germs may enter water supplies into which no sewerage system discharges. The ease with which any body of water may be infected and may become the means of distributing disease, by the act of an individual who has the disease in so mild a form that he is not confined to the house or the hospital, or by one who is in the earlier stages of the disease or is convalescent, seems ominous when one reflects upon the fact that a single cubic centimeter of the urine of a typhoid fever convalescent has been found to contain *172,000,000 germs, and that a single gram of fecal discharge from a typhoid fever patient has been found to contain †1,000,000,000 to 2,000,000,000 germs. A passenger upon a boat, a bather, a fisherman or a pleasure seeker wandering along the bank may easily become the means of causing an epidemic. In a number of well authenticated cases it has been shown that the fecal discharges of a single individual

*Petruschky, Centralblatt fur Bakteriology, XXIII, page 579 (1898).
†Hazen, Filtration of Public Water Supplies, third edition, 1900, page 215.

suffering from typhoid fever, having been thrown upon the ground, have thence been washed by falling rain or melting snow into a nearby stream which, further down in its course, served as a source of water supply, and have caused serious epidemics resulting in the loss of many lives. The dangers from these various sources are so real, so serious and so omnipresent, they constitute so neverceasing a menace to health, that it would seem to be but the plainest duty and certainly the wisest and safest course to urgently advise, if, indeed, not to insist, that none of the ordinary surface waters of this State shall be used for drink unless they be first efficiently filtered, or in cases where filtering is impracticable, they be rendered innocuous and safe by thorough boiling.

GROUND WATERS: More than two million of the inhabitants of this State drink water drawn from about five hundred thousand wells, the greater number of which are of inconsiderable depth, receive seepage from all of the pervious strata, which they penetrate, from the surface down, and in consequence of the ease with which polluted drainage finds its way into them, constitute an ominous and constant menace to the health of those who use them.

Every year there occur, in many of the towns and villages of this State, destructive outbreaks of typhoid fever, which are almost invariably traceable to the use of water drawn from polluted shallow wells, wells the character, location and surroundings of which, often exhibit at once to the competent sanitary inspector, the dangers to which the unsuspecting, or oftentimes carelessly indifferent, users expose themselves. A very considerable proportion of the public is widely awake to the danger attending the use of surface waters into which sewers are seen or otherwise known to discharge, but altogether too little attention is given to the conditions and facts which result in the pollution of ground waters.

The common belief, that filtration through the ground purifies water is of course well founded, but the conditions upon which the efficiency of ground filtration depend, are far too often either not understood or are ignored.

The individual who, alive to the danger and aware of the conditions which ensure his security, sees to it that the wastes of his own household are so disposed that they cannot pollute the water supply, is too often at the mercy of a more ignorant or less careful neighbor, who hats a cesspool or a privy vault, or throws household wastes upon the ground in too close proximity to his own and to his neighbor's well.

It must be borne in mind that the purifying power of the soil is limited and that earth which is kept saturated with drainage from the refuse matters, soon becomes overburdened and fails to remove from the percolating fluids those constituents which are the real sources of danger.

The earth agencies which mainly bring about the decompositions and oxidations, resulting finally in the complete destruction of organic matters and their conversion into harmless organic substances, are the myriads of bacteria which infest the surface soil strata. Unless they be supplied with free oxygen either by admission of air into the interstices Of the soil, or by saturation of the waters of the soil with air or oxygen, the complete oxidation of the organic matters cannot be effected.

It is chiefly the exclusion of air or oxygen from the soil by the drainage with which the earth is saturated, that prevents the effective and complete action of the bacteria of the soil, which otherwise serve as natural scavengers.

Ground filtration of polluted water, in order that it be effective, must be in some degree intermittent, that is, the filtering material must be frequently renewed, either by actual replacement or by exposure to the oxidizing action of air. This principle, the basis of successful practice in the management of filtration plants for the purification of polluted water supplies, and likewise the basis of one of the best of the modern methods of sewage disposal, is not generally apprehended by those who depend for their water supply upon shallow wells, although it applies with equal force to the process of soil-filtration upon which they place reliance for the removal of all objectionable matters from the liquids which find their way through the soil to the wells. Because the water from such wells is in general clear, sparkling, cool, and of agreeable taste, it is popularly supposed that it is wholesome; and the continued use of such waters for drink during many years is frequently cited as an argument in their favor.

It must be remembered that sewage from healthy sources may, in a diluted state, be drank with impunity. Very few people would *choose* to do this, yet oftentimes many do so unwittingly in their use of shallow well water.

The danger lies in the fact that the refuse, the drainage from which contributes to the supply of the well, may at any time receive dejecta from diseased beings, and the well in consequence become a possible means of distributing the disease.

Although matters which are offensive to the senses are commonly either mechanically removed or are oxidized, or are otherwise rendered innocuous during the passage of sewage-laden waters through the soil, yet the danger instead of being thereby lessened is frequently increased by reason of the false security which this merely apparent purification engenders. Germs in general, but more particularly those germs which are the specific cause of disease, are known to pass for considerable distances through certain water bearing soil strata and to remain in the palatable but deadly infusion from which most of the other organic substances have been removed.

Contamination of the water supply may occur in the most unsuspected ways. Sometimes water bearing strata which supply wells or springs so situated as to be free of any possible local contamination, outcrop at a distance, but at places where the surface is polluted, or they may receive their supply from polluted surface waters.

The celebrated epidemic of typhoid fever at Lausen, Switzerland, in 1872, was caused by the pollution of a mountain stream, some of the water from which, it was subsequently shown, passed underground for a mile through a mountain of glacial detritus to issue in part at a spring which served as one of the sources of supply for the village. It was shown unmistakably that the water of this spring caused the epidemic among the users, and it was shown conclusively that the infection of this water was caused by the dejecta of certain typhoid fever cases at a farm-house a mile or two away across the mountain being thrown into the brook at a point above that at which there proved to be an underground connection with the spring. In this case the typhiod fever germs passed for at least a mile through earth strata.

The earth strata in many portions of this State are of such character and so variously distributed and arranged that the passage of waters from contaminated surface sources underground to wells and springs at short distances easily occurs, and there is every reason to believe that infection with typhoid fever germs is frequently occasioned among the inhabitants of this State in this way. In several parts of the State the rock strata which lie at or near the surface and yield a supply of water by means of wells of comparatively little depth, are so broken that drainage easily passes through rifts and cracks directly to the wells without being freed of germs.

Numerous instances of the dissemination of disease to the extent of producing great loss of life by epidemics, by the use of well or spring waters which were highly prized because of pleasant appearance and taste, are to be found recorded in sanitary literature.

The facts involved in the foregoing statements are well understood by physicians and scientists, and are so thoroughly recognized by boards of health, that most of the greater municipalities have provided means for the examination and control of their water supply and the disposition of sewage. The department of health of the city of Chicago has provided for the vigilant inspection and the constant investigation of the water supplied to the people of the metropolis. In a number of the larger towns of the State the water supply is occasionally made the subject of a sanitary examination, but no extensive investigations of the ground waters of this State have hitherto been made; although, contrary to popular belief, diseases arising from, or distributed by, impurities in the water supply are much more prevalent in the smaller towns and the country districts than in the large cities.

In establishing the chemical survey of the waters of the State, the trustees of the University made provision for examination into the sanitary condition of any drinking water used by citizens of Illinois, and thus afforded opportunity for protection of the inhabitants of the towns, the villages, and the rural districts, from the unwitting use of impure drinking water and the attendant consequences.

The extent to which advantage has been taken of this provision is indicated by the following table which shows the numbers of water samples which we have examined at the request of local health officers or individual citizens.

TABLE SHOWING THE NUMBERS OF WATER SAMPLES EXAMINED AT THE DIRECT REQUEST OF PRIVATE CITIZENS OR LOCAL HEALTH OFFICERS, ARRANGED BY YEARS AND ACCORDING TO THE NATURE OF THE SOURCE.

SOURCES.	Oct. 1895, to Dec. 31. 1896.	YEARS.						TOTALS FOR EACH SORT OF SOURCE.
		1897	1898	1899	1900	1901	1902	
Surface waters, rivers, lakes and ponds	69	72	102	54	59	61	97	514
Springs	16	21	34	23	22	35	28	179
Cisterns	12	19	17	7	7	3	10	75
Natural ice	4	12	1	11	9	4	9	50
Artificial ice	......	1	......	2	1	......	1	5
Water for artificial ice	3	......	......	3	......	1	1	8
Water for natural ice	......	2	......	......	......	3	1	6
Shallow wells in rock	28	16	8	22	12	22	10	118
Deep wells in rock	58	48	34	26	36	56	59	317
Flowing wells in rock	45	8	16	1	13	14	3	111
Shallow wells in drift	500	245	168	243	274	209	243	1882
Flowing wells in drift	63	5	4	9	4	......	3	28
Deep wells in drift	64	68	43	30	24	36	63	328
Sewage	37	.....	21	25	10	.....	1	94
Total samples per year	839	517	448	467	471	411	529	3715

Each of these thirty-seven hundred samples of water has been carefully examined, and a separate report and recommendation concerning each has been given to the parties by whom the waters were sent to us. In only a very few instances have more than one sample been sent to us from any one of these sources, so that the data and the recommendations made are, in most cases, of but temporary and local interest, and consequently are not published in this report.

These waters have come from all parts of the State, and, while it would be of but little importance here to name the various localities, it may be of interest to note the fact that the samples have been sent to us from four hundred and seventy-eight towns and hamlets and that only two counties of the State are unrepresented. The map herewith gives a fair idea of the distribution of the localities in question.

Accompanying most of the samples of water from ordinary shallow wells, there came to us the statement either that cases of typhoid fever existed in the families which used the water, or that this disease was prevalent in the neighborhood. Careful consideration of the analytical data, the character and depth of the wells and the nature of the surroundings led us to the conclusion that a large proportion of the wells in question received drainage from refuse animal matters, although in general the removal or the oxidation of the organic matters seemed to be quite complete. Nevertheless, since the conditions in most cases appeared to be such that the soil filtration might at times be incomplete, the reports made upon such waters included the recommendation that the water should be used for drink only after efficient filtering or boiling, or that the use of the water of the well for drink be discontinued at least until steps should be taken to prevent any possible access of animal drainage in unoxidized condition.

It seems quite evident to us, that, although the dissemination of typhoid fever may often be effected in ways not directly ascribable to the use of contaminated water, yet the use of the water of shallow wells, situated as nearaly all of them are in close proximity to sources or deposits of animal refuse, is chiefly accountable for the widespread prevalence of typhoid fever in the smaller towns and the country districts of this state.

So far as the unwholesomeness of the waters of the ordinary shallow well is concerned, the conditions are steadily becoming worse, and must necessarily continue so to do, for as the population increases, naturally the wastes of habitation likewise increase, while the methods of disposition of such wastes, so far at least as concerns the country places and small towns, remain the same. For the individual household, it would be by far the best plan to entirely abandon the use of shallow wells and to use, for drinking purposes at least, only the water obtained from deep strata by means of driven wells tightly cased up so that none of the drainage of the strata lying near to the surface enters. Such wells, while somewhat more expensive, are highly advantageous in that the water which they supply is in most cases entirely unobjectionable so far as the dissemination of water-borne infectious diseases is concerned, for as a rule their water supply is drawn from sources which underlie impervious strata of clay so that none of those constituents of drainage which cause the spread of disease can reach them. The chief objection to the use of such waters arises from the fact that many of them are of unpleasing appearance, that is, are turbid when drawn or soon become so upon exposure to the air, and frequently they possess a taste which is unpleasant to those not accustomed to their use; this is particularly true of waters drawn from the drift.

WATER FROM THE DRIFT.

Nearly the whole surface of our state is covered with deposits of glacial detritus, the drift and the loess, to depths of from ten to one hundred and fifty feet, in some parts even to a depth of two hundred and fifty feet or more. These deposits include strata of sand, gravel, and clay, in almost infinite variety of character, fineness, and states of admixture with each other, and range from pure, clean rock fragments, silica, etc., and pure kaolin, on the one hand, to indeterminate mixtures containing large proportions of organic matters, the remains of vegetable life, on the other.

Thronghout large areas of the State, ancient surface soils, peat beds, and the like have been covered by considerable deposits of sand, gravel, clay, etc.; in many localities several such buried surface soils containing the remains of the organic matters incident to the luxuriant vegetable growths of past ages, lie one below another, separated by intervening drift deposits which range from several feet to fifty or sixty feet in thickness.

Many of the drift strata are water-bearing and a large proportion of the citizens of Illinois outside of the larger cities drink water drawn from wells which are sunk more or less deeply in the drift. These waters in normal condition present almost endless variety in minor characteristics, depending of course upon the composition of the deposits with which they have been in contact, but they fall naturally into two groups with reference to their leading qualities and the relative proportions of their several nitrogenous constituents. These two groups may be designated as shallow drift waters and deep drift waters respectively, since, in general, the differences manifested depend upon the depth from which the waters are drawn.

NORMAL SHALLOW DRIFT WATERS contain the various salts and other substances which have been leached from the upper soil, essentially in unchanged condition, *i. e.,* they contain chlorides, sulphates, carbonates, and silicates of calcium, magnesium, potassium, and sodium, with minute quantities of iron and aluminum compounds, together with considerable quantities of nitrates, but only minute quantities of saline ammonia and albuminoids; organic matters are almost entirely absent. Nitrites are frequently present in notable quantity.

NORMAL DEEP DRIFT WATERS contain in general the same mineral salts as the shallow waters but usually the quantity of iron is considerable, and the nitrates are either entirely absent or present in but minute quantity, while free ammonia is abundant and albuminoids are present in comparatively considerable quantities.

"Oxygen consumed" is high, and the water residue blackens upon being heated, showing that much organic matter is contained.

In appearance and in palatability the two classes of waters present marked differences.

The waters from shallow wells are well aerated, and are clear, sparkling, cool, and of agreeable taste; those from the deeper wells, on the other hand, contain little or no oxygen, possess in many cases a disagreeable taste due to the presence of marsh gas, accompanied occasionally by minute quantities of sulphuretted hydrogen, and are either turbid or become turbid quickly on exposure to air, owing to the oxidation of the iron carbonate which they contain and the consequent precipitation of insoluble ferric compounds. The precipitating particles are often so minute as to be at first indistinguishable except from the color which they impart to the water, but after a short exposure to the air the water becomes opalescent, then decidedly turbid; finally a brown deposit similar to iron rust is produced, and after this has separated the water becomes clear and colorless.

Waters of this class soon become infested with the microscopic filamentous plant *crenothrix*. This organism is not especially deleterious to the health, but it brings about the separation of the iron from the water and its deposition as rust like ferric hydroxide in and upon its own filaments, the growths causing a marked turbidity of disagreeable appearance and often producing unpleasant tastes and odors. Frequently it grows so luxuriantly in the distributing system as to clog the pipes with masses of dirty greenish or brown colored, iron impregnated vegetation. At times, the growths becoming loosened from the pipes, cause the liquid flowing from faucets to have the appearance of a fluid mud of iron rust rather than that of water.

Although these unpleasant characteristics of the deep drift waters give rise to much prejudice and objection to their general use for drink, nevertheless, from the sanitary standpoint, they are usually to be preferred to the clear and palatable waters of the shallow wells, since the evidence of numerous analyses shows, that they are far less subject to pollution with refuse animal matters than are the latter, while the organic matters which they contain are derived from the buried vegetable remains referred to above, and are comparatively harmless.

In the interest of the public health, it would be far the best for the people of even the smallest towns, to use for drinking purposes, only the water supplied by one general plant, the sanitary condition of which could be and should be thoroughly and periodically investigated by experts acting under the direction of a water commission or the State Board of Health.

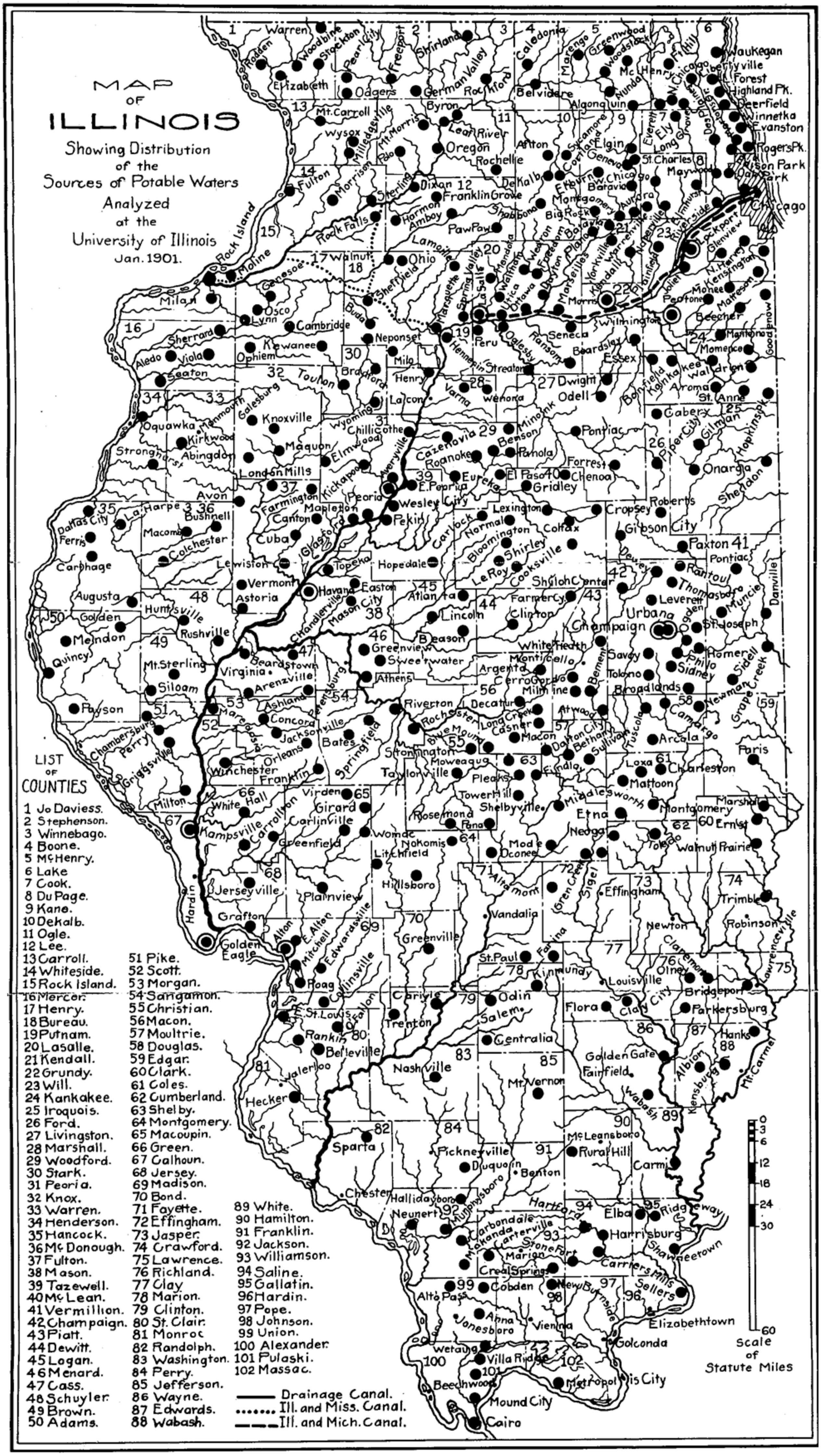
THE CHEMICAL EXAMINATION OF WATERS.

The general purpose of the chemical analysis of potable waters is well understood by the public to be intended in some way for the determination of the question of their purity and wholesomeness, but nevertheless, much misconception exists regarding the method of arriving at an opinion, and the significance of the analytical data. It must be understood that the results of a chemical examination of a water are not in themselves sufficient to indicate the character of the water in any ordinary case. In the assay of gold ore, the determination of the quantity of gold is all that is necessary, for the value of the ore depends directly on the amount of the precious metal contained, and this is directly represented by the analytical result. The data resulting from a water analysis, on the other hand, require interpretation, and it is essential that the one who is to interpret shall have complete information regarding the history of the water, its source, the surroundings, etc.; also, in case of a well, the nature of the strata from which the water comes, as well as the overlying strata, and in fact, as complete information as it is possible to obtain. Even with this information, the formation of a correct conclusion is in many cases a difficult matter, and is ordinarily entirely beyond the powers of the layman.

A wholesome water from a certain source may contain such quantities of the varions constituents as would, if found in the water from a different source, serve to entirely condemn the latter. The significance of the results depends usually directly upon the source of the water.

Further, certain substances, the determination of which is most important, are present usually in but minute quantities in potable waters, and these quantities are very easily increased by the use of improper methods and vessels in

Plate I.



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taking the sample. Some of the constituents of the water readily change on standing, especially if the sample becomes warm and is exposed to the light. Accordingly, in providing for the chemical examination of waters for the citizens of the State, it was necessary to make certain that the samples should be collected with the utmost care and in vessels properly cleaned, as otherwise the results of the analyses would be valueless. In the case of each collection which is to be made, whether it is a part of our general survey or at the request, and for the immediate information and benefit of individual citizens of the State, the method of general procedure is precisely the same.

Glass stoppered bottles of one gallon capacity are used for collections. These are cleaned by means of a solution of potassium bichromate in diluted sulphuric acid, then rinsed with fresh ammonia-free distilled water, drained, and the stoppers secured in place by being covered with clean canvas or rubber cloth tied down tightly. The bottles are then packed in wooden cases with open tops and shipped to the collector. An envelope shipping tag containing printed directions for the collection of the sample and a blank certificate to be filled out by the collector with all necessary information concerning the sample, is tied to the neck of each bottle. When samples for bacterial examination are to accompany those intended for chemical analysis, the bottles are packed in a closed case in which there is a large galvanized sheet iron box to hold ice. The directions and certificates used are as follows:

CHEMICAL LABORATORY UNIVERSITY OF ILLINOIS

INSTRUCTIONS FOR COLLECTING SAMPLES OF WATER FOR ANALYSIS.

1. *From a Well.* Water should be pumped out freely for a few minutes before it is collected. The bottle is then to be placed in such position that the water from the spout may fall directly into it, and rinsed out with the water three times, pouring out the water completely each time. It is then again to be placed under the spout, filled to overflowing, and a small quantity poured out, so that an air space of about an inch shall be left under the stopper. The stopper must be rinsed off with flowing water, inserted in to the bottle while still wet, and secured by tying over it a clean piece of rubber cloth or canvas. The ends of string must be sealed on top of the stopper. *Under no circumstances must the inside of the neck of the bottle or the stopper be touched by the hand or wiped with a cloth.*

2. *From a tap.* Allow the water to flow freely from the tap for a few minutes, and then proceed precisely as directed above.

3. *From a Stream, Pond or Reservoir.* The bottle and stopper should be rinsed with the water, if this can he done without stirring up the sediment on the bottom. The bottle, with the stopper in place, should then be entirely submerged in the water and the stopper taken out, at a distance of twelve inches or more below the surface. When the bottle is full, the stopper is replaced (below the surface, if possible,) and finally secured as above. It is important that the sample should be obtained free from the sediment at the bottom of a stream and from the scum on the surface. If a stream should not be deep enough to admit of taking a sample in this way, the water must be dipped up with an absolutely clean vessel and poured into the bottle after it has been rinsed. *The sample of water should be collected immediately before shipping by express, so that the shortest possible time shall intervene between the collection of sample and its examination.*

The accompanying "Certificate" must be filled out carefully and enclosed in the envelope shipping tag.

CERTIFICATE.

Fill out carefully and enclose in the envelope tag addressed to the University of Illinois, Department of Chemistry, Champaign, Illinois.

SAMPLE OF WATER.

From ....
Name of Town.

Collected and sealed by ....
Name and Address of Collector.

....

Collected from ....
State whether the water is from a stream, pond, reservoir, well, tap or other source, and if drawn from a tap state original source of water; state also whether the water has been filtered.

....
If from a well or spring state location of well, street and number or section, range, etc.

Collected on..
Give day, date, and hour of day.

Shipped by.................. Express,........... ....
Company. Give day and hour of day.

REMARKS—In case of any abnormal or unusual conditions existing in the source of the water, mention the facts; as, for instance, if the wells, streams or ponds are very full or swollen by recent heavy rains, or other cause; or are unusually low in consequence of prolonged drought; or if there is a great deal of vegetable growth in or on the surface of the water. Write on other side of this certificate.

NOTE—The data resulting from an analysis are generally unintelligible to the layman. If an interpretation of the results and certificate as to condition of the water is desired, the fullest possible information concerning the source of the water, surroundings, and conditions, etc., must be forwarded with the sample.

If from a well, state depth of well.........; height of water.....

Character of soil and of strata from which water is drawn.......

Sort of well, *i. e.,* driven or dug, cased up, cemented or not, etc....

Proximity, and sort, of drains, cesspools, outhouses, etc........

Any ground for suspicion ....

The routine analyses have included determinations of:

1. Turbidity.
2. Sediment.
3. Color.
4. Odor.
5. Residue on evaporation.
6. Loss on ignition.
7. Nitrogen as free or saline ammonia.
8. Nitrogen as albuminoid ammonia.
9. Nitrogen as nitrates.
10. Nitrogen as nitrites.
11. Chlorine.
12. Oxygen consumed.

In case of turbid waters, which have come mainly from surface sources, we have made determinations of the residue on evaporation, lose on ignition, nitrogen as albuminoid ammonia, and oxygen consumed, both with the water in its original condition and after careful filtration, in order to distinguish between constituents contained in solution and those held in suspension.

Wherever it has seemed to be of importance, determinations of the hardness and the degree of alkalinity have been made.

In a very large proportion of the surface waters examined, the total organic nitrogen has been determined by the Kjeldahl process, both in the original water and in a filtered portion of the same.

The dissolved gases, more especially the dissolved oxygen, have been determined in several hundred samples.

In addition to the sanitary examination of some 10,833 samples of water from all sources, we have made quantitive analysis of the mineral constituents of more than 450 samples of ground waters.

METHODS OF PHYSICAL AND CHEMICAL EXAMINATION.

When the samples are received at the Laboratory, a serial number is immediately placed upon each bottle and upon the tag or certificate which accompanies it, then the rubber cloth which covers the stopper is removed, the stopper and neck of the bottle cleaned, and, after withdrawing the stopper, some of the water is so poured out as to rinse off the lip of the bottle.

After noting the turbidity, but before beginning the analysis, the sample is thoroughly shaken, and every effort made to keep all solid matters in suspension while the portions are being taken for the various determinations. Ground waters are almost always so clear that ordinarily no attempt is made to determine suspended matters. If the water is distinctly turbid, which is generally the case with our river waters, certain determinations as noted above, are made upon the filtered water. For this purpose nearly half of the sample is immediately filtered through heavy Swedish filters, which have been previously washed with nitrogen free water. Often it is necessary to filter more than once.

The nitrites are always determined immediately upon reception of the sample in the laboratory; the determination of nitrates, the ammonias, and oxygen consumed are also begun immediately, and the others are started as soon as possible. Some of the determinations, as the total solids and chlorine, are ordinarily not finished until several days after that upon which the sample was received in the laboratory.

In the tables of results, the date of collection indicates the date placed upon the collector's tag at the time the sample was taken. The date of analysis refers to the time of the receipt of the sample in the laboratory, which also invariably represents the day upon which the analysis of the sample was begun.

TURBIDITY AND SEDIMENT.—The amount of sediment and the degree of turbidity are noted from mere visual inspection at the time the sample is received and again in a portion of the sample after standing over night, and is indicated in the tables of results by the very approximate terms, "slight," "distinct," "decided," and "much," to indicate the degree of turbidity, and the terms, "very little" "little," "considerable," and "much," to indicate the relative quantities of sediment. A more definite idea of the amount and nature of the suspended matter is, of course, to be had from the figures recorded in the respective columns under the general headings—"Total Solids," "Loss on Ignition," "Oxygen Consumed," "Albuminoid Ammonia," etc.

ODOR.—Note is made of the odor after thoroughly shaking the water in the bottle just before the portions of the sample are poured out for the determination of the various constituents, and the result of the observation is roughly expressed as "oily," "gassy," "musty," "none," etc. In some cases the odor is observed again after heating a portion of the water nearly to boiling.

THE COLOR.—The color of the water is determined by comparison with the color developed in the ammonia standard solution used in nesslerization; the surface waters of this state must, in most cases, be filtered for this purpose.

The figure recorded in each case represents the volume of standard ammonium chloride solution required to develop the same tint as that possessed by the water, when diluted to fifty cubic centimeters with ammonia free water and treated with the usual amount of nessler reagent. That is, the color recorded as 1, represents the color developed by nesslerization of a solution containing one cubic centimeter of the standard ammonic chloride solution diluted to fifty cubic centimeters with ammonia free water, or, in other words, fifty cubic centimeters of a solution which contains ammonic chloride equivalent to one one-hundredth of a milligram of nitrogen.

The tubes employed are those used in the regular nesslerization; they are of colorless glass, ten inches in extreme length and seven and three fourths inches high to the mark; the bottoms are ground smooth and polished.

TOTAL SOLIDS.—For the determination of the total solids, to two hundred and fifty cubic centimeters of the water, five cubic centimeters of a four-tenths per cent sodium carbonate solution are added, and the liquid evaporated to dryness in a platinum dish upon the water bath. When dry, the dish and its contents are placed in an air bath, kept at 180° Centigrade, and heated until the weight is essentially constant; the time of heating ordinarily being one hour. Allowance is, of course, made for the quantity of sodium carbonate added before evaporation.

LOSS ON IGNITION.—The loss on ignition is determined by heating the residue from evaporation in a radiator to low redness. No attempt is made to entirely burn away all carbonaceous matter contained in the residue and the residues frequently are quite dark in appearance from presence of minute particles of carbon. Record is made of any odors resulting from decompositions caused by the ignition, and also of colored fumes from decomposition of nitrates, which latter occurs, however, only when rather excessive quantities of nitrates are present, as in some shallow well waters.

CHLORINE.—The chlorine determinations are made by the ordinary standard process by titration with silver nitrate solution. The indicator employed is potassium chromate of five per cent strength; one cubic centimeter of the solution being used with each lot of water titrated. The silver nitrate solution is of such strength that one tenth of a cubic centimeter represents one part of chlorine in a million parts of water, when fifty cubic centimeters of the water are used for the determination. The standard silver nitrate solution is checked by titration against a standard sodium chloride solution.

The end point is in all cases determined by close comparison with a blank. Fifty cubic centimeters of water are ordinarily taken for the determination, but in case there is reason to suppose that the water contains less than ten parts of chlorine per million, a larger quantity is used. In all such cases, two hundred and fifty cubic centimeters or more are employed. To the measured water, five cubic centimeters of sodium carbonate solution (four grams $Na_2 CO_3$ to the liter) are added, and the liquid concentrated, the final volume being brought to fifty cubic centimeters before the determination is made. In cases of some artesian well waters and others which contain considerable chlorine, a smaller quantity of the sample is diluted with chlorine free water to fifty cubic centimeters before titrating.

OXYGEN CONSUMED.—One hundred cubic centimeters of the water are measured into an Erlenmeyer flask of two hundred and fifty cubic centimeters capacity, two cubic centimeters of pure concentrated sulphuric acid are added, and then ten cubic centimeters of standard potassium permanganate solution, of which one cubic centimeter is equivalent to one-tenth of a milligram of oxygen. The flask is then so placed in boiling water that the level outside of the flask is above that of the liquid within. In this way the temperature with in the flask is brought up almost to that of the water, which is kept briskly boiling, in the bath itself, and any considerable concentration by evaporation of the water in the flask, as also "bumping," which frequently results in the loss of the sample, is entirely avoided. At the end of thirty minutes' digestion, the flask is removed and exactly ten cubic centimeters of standard ammonium oxalate solution are added. When the solution has become perfectly colorless, standard potassium permangenate solution is run in until the development of a faint pink color indicates that the end point is reached. As the ammonium oxalate solution and the permanganate solution are of equivalent strength, we need only consider the permanganate used in the titration. The strength of the reagent is such that one cubic centimeter of potassium permanganate solution used in the titration represents one part of oxygen consumed in one million parts of water, when one hundred cubic centimers of the water sample has been taken for the determination.

In some cases it happens that the ten cubic centimeters of potassium permanganate solution are insufficient for the oxidation and the liquid becomes decolorized during the heating. Another test is then made, in which, instead of ten cubic centimeters, fifteen or twenty or more, as the case may be, are employed, the procedure otherwise being the same as above.

NITROGEN AS FREE OR SALINE AMMONIA.—To five hundred cubic centimeters of the water sample, or in case of river waters, two hundred and fifty cubic centimeters of the sample diluted to five hundred cubic centimeters with nitrogen free distilled water, five cubic centimeters of a twenty per cent sodium carbonate solution are added and the liquid distilled from round bottom Jena glass flasks of nine hundred cubic centimeters capacity. The flasks are supported upon asbestos rings and heated by direct application of the flame. Connection with the condenser is made by means of the modified form of Reitmair and Stutsen safety bulb designed by Hopkins.

We at first employed condensing tubes of block tin, three-eighths of an inch internal diameter, with cooling surface twenty inches in length, but we find tubes of aluminum of the same dimensions far more satisfactory.

The tubes pass through a galvanized iron tank through which a constant current of cold water is kept flowing. Before each determination the entire apparatus is thoroughly steamed until free of ammonia. In all ordinary cases of well waters the distillate is collected in nessler tubes, the boiling being conducted at such rate that each tube is filled in from eight to ten minutes. When four tubes are filled it is assumed that all free ammonia is over.

As most of the river waters and many deep well waters contain considerable nitrogen as free ammonia, the distillate from these is collected in flasks of two hundred cubic centimeters capacity, the distillation being continued until the flask is full to the mark, and at such rate that from thirty to forty minutes elapse between the appearance of the first drops of distillate and the completion of the distillation of the two hundred cubic centimeters. The distillates thus caught are thoroughly mixed, the flasks stoppered and set aside for nesslerization, a suitable aliquot portion being subsequently measured off for this purpose.

NITROGEN AS ALBUMINOID AMMONIA.—The determination of the albuminoid ammonia is made in the usual manner upon the residue remaining from the determination of free ammonia. The apparatus and contents having been somewhat cooled, fifty cubic centimeters of the usual alkaline permanganate solution are added through a funnel, the flask immediately connected again with the still, and distillation proceeded with at the same rate as in the determination of the free or saline ammonia. The distillate is caught either in nessler tubes or in flasks of two hundred cubic centimeters capacity, according as the water contains little or much albuminoid matter, and the distillation is considered complete when two hundred cubic centimeters have come over, though in many cases ammonia comes over slowly and in small quantities if the distillation be continued, and even after repeated additions of nitrogen free water.

NESSLERIZATION.—In conducting the nesslerization, care is always taken that the distillates and the standards be of th same temperature. Commonly those distillates obtained in the afternoon are allowed to stand in a cool place until the next morning before proceeding with the determination.

The ammonium chloride solution used for the comparisons is of such strength that one cubic centimeter contains ammonium chloride corresponding to one one-hundredth of a milligram of nitrogen.

The eighteen standards used in the comparison are made of the following strengths, *i. e.,* the quantities of standard ammonium chloride solution used are: .05, .1, .2, .4, .6, .8, 1, cubic centimeter, 1.2, 1.4, 1.6, 1.8, 2, 2.5, 3, 3.5, 4, 4.5, 5, cubic centimeters.

In nesslerizing, one cubic centimeter of the nessler solution is added to the contents of each nessler tube, and the mixture allowed to stand twenty minutes for the development of full color. The reagent is always added to the samples and the standards simultaneously, and the readings are all taken within one hour of the time when the reagent was added.

The nessler tubes which we use are of colorless glass, capacity fifty cubic centimeters, length seven and three-fourths inches to the mark. The bottoms of the tubes are ground flat and polished.

The comparisons have been greatly facilitated by the use of a black wooden box or camera which cuts out all side lights, the tubes being illuminated from the bottom by means of a mirror reflecting the light from the northern sky, the cross section of the tubes being brought to the eye by another mirror placed just above the tubes.

TOTAL ORGANIC NITROGEN.—In surface waters and some well waters the total organic nitrogen in the original sample and in the filtered sample is determined by the Kjeldahl process as follows: Two hundred and fifty cubic centimeters of the water are diluted with two hundred and fifty cubic centimeters of nitrogen free distilled water, then five cubic centimeters of twenty per cent sodium carbonate solution are added and the mixture distilled as usual for the removal of all free ammonia, the distillation being pushed to precisely the same point as that reached in the distilling over of free ammonia for the determination of free or saline ammonia and albuminoid ammonia. To the residue in the flask, ten or twenty cubic centimeters of pure nitrogen free sulphuric acid are added and the solution heated under the proper precautions until the water is all expelled and the organic matter completely destroyed.

After cooling the residue, two hundred and fifty cubic centimeters of ammonia free water are added and then an excess (usually about fifty cubic centimeters) of strong nitrogen free sodium hydroxide solution. The flask is immediately connected with the condenser, the contents mixed by thorough shaking, and the distillation, which is conducted at first very slowly, is continued until two hundred cubic centimeters are distilled over. After thorough mixing, an aliquot portion of the distillate is employed for the nesslerization in the ordinary manner.

NITROGEN AS NITRATES.—One hundred cubic centimeters of the water are treated with two cubic centimeters of nitrogen free sodium hydroxide solution of thirty-three per cent strength, then one gram of aluminium in the form of a thin strip of foil is introduced and the tube and contents placed in a thermostat which is kept at 30° Centigrade, where it is allowed to remain over night. The reduction to ammonia is ordinarily complete when the examinations are continued the following morning.

In our practice we have found it simplest and most satisfactory to distill over the ammonia instead of attempting to nesslerize directly.

The contents of the reduction tube, including such portion of the aluminum foil as remains, are transferred to a distillation flask, two hundred and fifty cubic centimeters of nitrogen free water being used to wash out the tube and dilute the liquid. The distillation and subsequent nesslerization are conducted precisely as for the determination of free or saline ammonia. Correction is of course made for saline ammonia originally contained in the water and that produced by the reduction of the nitrites present.

When nitrates are present in very small quantity a greater volume of water is used, but after being made alkaline it is concentrated to one hundred cubic centimeters before reducing. If large quantities of nitrates are present, five or ten cubic centimeters of the sample are used after diluting to one hundred cubic centimeters with nitrogen free water.

In cases where much free ammonia is contained in the water sample which is being examined, which include most river waters and many deep well waters, this is removed before reducing. For this purpose the proper amount of sodium hydroxide solution is added and the mixture boiled rapidly in an open vessel to about one-third of its volume, the final volume being brought up to one hundred cubic centimeters again by the addition of nitrogen free water; then the reduction and subsequent determination is conducted as above.

NITROGEN AS NITRITES. Fifty cubic centimeters of the water are placed in a nessler tube, one cubic centimeter of an acid solution of naphthylamine hydrochloride (8 grams of naphthylamine, 8 cubic centimeters of strong hydrochloric acid, and sufficient water to make one liter of solution) and one cubic centimeter of a saturated solution of sulphanilic acid in water containing five per cent of strong hydrochloric acid are added, and the mixture allowed to stand for one hour.

Simultaneously with the addition of the reagents to the water which is being examined, the same quantities of reagents are added to a series of solutions which contain accurately known quantities of pure sodium nitrite. If a color appear in the water sample in course of twenty minutes to one hour after addition of the reagents, it is matched with the tint produced in some one of the series of standards, and the quantity of nitrites contained in the original water is regarded as being the same as that contained in the standard which produces the same tint. If no color develops in the course of an hour, the water is considered free from nitrites.

Many of the river waters examined contain so much nitrites that the color developed in the undiluted sample is too deep for accurate comparison; in such cases quantities of from one to ten cubic centimeters are diluted to fifty cubic centimeters with nitrogen free water before adding the reagents.

Standard solution of sodium nitrite is prepared from pure silver nitrite by reaction with sodium chloride, and for convenience in making up the standards is made in two strengths, one solution containing in one cubic centimeter the equivalent of .005 milligram of nitrogen, the other .0005 milligram of nitrogen,

Waters which are turbid or deeply colored are clarified and decolorized by treatment with aluminium hydroxide and filtration before testing for nitrites. The comparison of tints is made in the tubes and the camera described under Nesslerization.

DISSOLVED OXYGEN.—For the determination of dissolved oxygen, we have found the method of Albert Levy most satisfactory.* The process involves the use of a special pipette with glass cock at each end. The capacity of the pipettes which we have used is exactly 107 c. c. The reagents employed consist of a solution of 100 grams of caustic potash in a liter of water, a solution of 20 grams of ammonio ferrous sulphate in a liter of water, a fifty per cent solution of sulphuric acid, and a standard solution of potassium permanganate of such strength that one cubic centimeter is exactly equivalent to one-tenth of a milligram of oxygen.

The method of procedure is as follows: The pipettes are filled with the water either by immersing in the stream itself or by use of a rubber syringe. Then two cubic centimeters of the caustic alkali solution is put into the funnel at the top, and, by careful manipulation of the two cocks, is allowed to enter and mix with the water without admitting air. The funnel is then rinsed out and five cubic centimeters of the ammonio ferrous sulphate solution introduced into the funnel and then into the pipette by the same manipulation as before. The water run out the pipette at the bottom as the reagents are admitted at the top is caught in the beaker in which the subsequent titration with permanganate is to be effected and which already contains two cubic centimeters of 5 per cent sulphuric acid.

It is assumed that the alkali and the iron solutions in entering the pipette displace their own volume of water, and with careful manipulation this undoubtedly is essentially effected, so that we may assume that within the pipette there remain one hundred cubic centimeters of the original water with seven cubic centimeters of the reagents.

The mixing of the liquids within the pipette is effected by shaking the pipette with an eccentric rotatory motion. In the course of a few minutes the action is completed, and from the color of the precipitate one may gather an idea as to the

*This method is as described in the Annuaire de L'Observatoire de Mont-Souris for 1883 and subsequent years.

relative amount of oxygen contained in the solution. That is, if the water is about saturated, the precipitate is apt to show a somewhat brownish color due to the ferric hydroxide, while if the quantity of oxygen is very small the precipitate is likely to be black, showing the preponderence of the ferrous hydroxide in the precipitate.

After a few minutes, when the action is thought to be complete, five cubic centimeters of sulphuric acid are introduced into the funnel, and the cock between the funnel and the pipette being opened, the sulphuric acid, by reason of its greater gravity, passes from the funnel down into the interior, and mixing with the liquid dissolves the hydroxides of iron and renders the entire liquid acid.

When this reaction is complete, as shown by the clearing-up of the solution, the contents of the pipette and the rinsing water are run into the beaker, and the excess of ferrous salt determined by titration with the standard permanganate solution. A blank is run upon one hundred and seven cubic centimeters of the original water for every determination that is made, this being easily done while the reactions are taking place within the pipette.

In running the blank, one hundred and seven cubic centimeters of the water are measured into a beaker, then seven cubic centimeters of the sulphuric acid are added, and the liquid mixed; after this the caustic potash, two cubic centimeters is added, and finally, precisely five cubic centimeters of the ferrous sulphate solution; then the titration is effected as in the actual determination. The difference between the two readings, *i. e.,* that of the blank and that of the direct determination, represents the quantity of dissolved oxygen in one hundred cubic centimeters of the water.

We have found the method of Levy more convenient than the Winkler method. Its advantages appear to us to be mainly due to the fact that the blank to accompany each determination is so easily made; whereas with the Winkler method, the determination of the blank, which, with the river waters concerned in these investigations is generally necessary for every sample examined, entails so much labor as to limit the applicability of the method.

As it has not been practicable for us to make all of the oxygen determinations upon the spot, we have had a great many special samples of water shipped from the river to the laboratory. The determinations of the oxygen in these are, in most instances, made within twenty-four hours of the time of collection, but in that length of time the dissolved oxygen is found in most cases to diminish considerably in amount.

The waters of the Illinois river and its tributaries and those of the Mississippi contain a great deal of organic matter which is easily susceptible to the influence of dissolved oxygen. We have found, however, that it is perfectly practicable to treat the water samples with a little mercuric chloride and thus prevent such reactions as result in the disappearance and consequent diminution of the dissolved oxygen; so that it has been practicable for us in the laboratory to make the comparison of the original quantity and also of the staying qualities of the dissolved oxygen in the water.

With a set of samples treated with a few drops of saturated solution of mercuric chloride, we get results which are essentially the same as those shown by determinations on the spot, while with the other set of samples which have been shipped in the original condition, *i. e.,* merely in bottles which are entirely filled but which have not been treated with mercuric chloride, it is found that the dissolved oxygen is considerably less in amount. The difference between the two is a rough indication of the condition of the water with respect to content of dissolved oxygen and content of such impurities as easily cause the disappearance of dissolved oxygen.

Our comparisons of the Winkler method *with the Levy method show that the latter method gives somewhat higher results, but the differences are ordinarily very slight, and for comparative results the Levy method is so superior in economy of time and labor that of late we have used it almost exclusively.

REPORTS OF THE CHEMICAL EXAMINATIONS.

Many citizens of the State have taken advantage of the opportunity offered by the University, to obtain chemical analyses of their respective water supplies and in consequence we have made examinations of many samples of water derived

*Berichte der Deutschen Chemischen Gesellschaft, volume xxi, page 2843.

from various individual household sources of supply, the number of such waters averaging about five hundred each year.

The results of all such analyses are reported immediately to the sender of the sample and when sufficient information concerning the source of the water is at hand, an interpretation of the results and an opinion regarding the wholesomeness of the water is furnished, together with whatever recommendations seem requisite or desirable. The blank form for the report is as follows:

DEPARTMENT OF CHEMISTRY, UNIVERSITY OF ILLINOIS.

URBANA, ILL., ...190....

Laboratory No. ....

Report of the Sanitary Chemical Analysis of Water Sent by

....

Source of Water ....

....

(Amounts are Stated in Parts per Million.

Total residue by evaporation ....

Fixed residue (mineral matter) ....

Volatile matter (loss on ignition) ....

....

....

Chlorine in chlorides ....

Oxygen consumed ....

Nitrogen as free ammonia ....

Nitrogen as albuminoid ammonia ....

Nitrogen as nitrites ....

Nitrogen as nitrates. ....

....

....

In order that the connection between the character and the surroundings of the source of supply, the data resulting from the chemical examination, and the opinion and recommendations based upon their consideration, may in some measure be understood by the parties interested, the following brief statement explaining the basis of interpretation has been prepared to accompany the reports.

INTERPRETATION OF RESULTS OF WATER ANALYSIS.

The statement of results is made in parts by weight per million parts of water by weight, hence, *one part,* as recorded in the report, is equivalent to one ten-thousandth of one per cent., or is equivalent to .058335 grain per United States gallon of 231 cubic inches.

In arriving at the conclusions set forth in the report the following is the basis of interpretation of the analytical data;

First, the substances referred to and upon which the report is made are not considered to be in themselves harmful in the quantities which are found in potable waters, but they are significant of the condition of the water for reasons which may be briefly stated as follows:

"TOTAL RESIDUE BY EVAPORATION" comprises the solid matters left upon evaporating the water and drying the residue at 180 degrees centigrade. It includes both inorganic and organic substances. The inorganic constituents are salts, and comprise mainly compounds of lime, magnesia, soda, potash, iron and alumina, with chlorine, carbonic, sulphuric, nitric and silicic acids. Unless the quantity of mineral matter is excessively high, the determination is not particularly significant, and ordinarily for sanitary purposes the individual constituents are not separately determined.

"FIXED RESIDUE" (mineral matter) is that portion of the total solids which is inorganic, and is neither burned away nor otherwise decomposed by application of heat.

"VOLATILE MATTER" (loss on ignition) comprises the loss in weight which the "total residue by evaporation" suffers on being heated to redness. It includes the organic matters, which burn away, and such constituents of the mineral matters as are volatile or are decomposed by heat into volatile products. This determination is of special significance only in so far as the manifestation of a change in color, the development of odors, or the evolution of fumes, or the absence of any such change, may indicate the nature of the constituents of the water.

"CHLORINE IN CHLORIDES" refers to the quantity of chlorine contained in the water in combination with the basic elements. It is a considerable constituent of common salt. Most animal matters contain more or less chlorides, and chlorides are constant and considerable constituents of sewage or drainage from refuse animal matters.

The presence of chlorine in water in amounts exceeding the normal quantity generally indicates that the water has been polluted by animal matters, but is not conclusive evidence thereof, and it must be remembered that the waters of many deep wells contain large quantities of chlorides derived from subterranean deposits of salt.

"OXYGEN CONSUMED" refers to the quantity of oxygen required to oxidize the organic matters present in the water. In general, a considerable quantity of oxygen required for this purpose represents a considerable quantity of organic matter in the water, and *vice versa,* a small quantity of oxygen consumed indicates comparative freedom from organic matters. However, many of the organic matters which may be contained in water are not readily affected by the oxidizing agent and in no case does the quantity of oxygen consumed bear a definite and direct ratio to the total quantity of organic matter contained.

THE ORGANIC MATTERS.—No practicable means exists for the accurate determination of the quantity and the character of the various individual organic substances contained in water.

These substances include living organisms, both vegetable and animal; products of organic life as fæcal matters, etc., and products of the decomposition of organic matters.

Nitrogen is an essential constituent of all living things; it is to the nitrogenous organic matters that the greatest sanitary importance attaches; and as accurate methods fo the determination of nitrogen in the four forms in which it may exist in water are available, the study of the organic matters is usually limited to the investigation of the nature and the quantity of the nitrogenous substances.

"NITROGEN AS ALBUMINOID AMMONIA" represents the nitrogen contained in the various organic substances which exist in the water in the undecomposed state. These include the products of organic life, as albuminous substances, tissues, urea, fæcal matters, etc., etc., substances which serve as nutrients upon which germs thrive and multiply; and also living organisms themselves, both vegetable and animal, including bacteria. The presence of much nitrogen as albuminoid ammonia *usually* suggests pollution with sewage or drainage from refuse animal matters.

"NITROGEN AS FREE AMMONIA," so-called, represents ammonia contained in the water in either the free or saline condition, and which usually proceeds from the natural decomposition of nitrogenous organic matters in the first stages of oxidization. Its quantity is ordinarily indicative of the amount of organic matter which is contained in the water, in a partially decomposed state. It is a characteristic and a considerable constitutuent of sewage.

Both free ammonia and albuminoid matters in water, in undergoing decomposition are oxidized, the final product being nitric acid, which unites with the basic mineral matters present and consequently appears as nitrates.

"NITROGEN AS NITRITES."—Nitrous acid, or nitrites, constitutes the second intermediate stage in the oxidation of nitrogenous organic substances into inorganic products. The presence of any considerable quantity of nitrite in the water shows generally that decompositions due to the vital processes of living organisms are under way, and the quantity of nitrite indicates in some degree the character and the amount of organized life present in the water.

"NITROGEN AS NITRATES."—Nitrates are the final products of oxidation of the nitrogenous matters; their presence in considerable quantity indicates that at least correspondingly considerable quantities of organic matters have been previously contained.

The significance of all four of these forms of nitrogen is not complete evidence unless considered in conjunction with the other constituents, and in reference to the nature of the source of the water.

Vegetable organic matter is comparatively harmless. The presence of animal matters on the other hand usually subjects the water to grave suspicion, since the danger attending the presence of organic matters in water arises chiefly from the fact that accompanying matters of animal origin there will be, in case of disease, also disease germs themselves.

STANDARDS OF PURITY.

Because of differences due to the nature of the strata from which waters are drawn or with which they have been in contact, the topography of the district, and the general environment of the sources, no fixed standards of purity whereby to judge the condition of any and all potable waters can be justly established, yet for purposes of comparison, and for the information and convenience of those to whom our reports are sent, the following limits have been provisionally adopted as a reasonable basis for reaching conclusions regarding the wholesomeness of the waters of ordinary shallow wells in the State of Illinois:

MAXIMUM LIMITS OF IMPURITIES.

Total Solids	500. parts per million
Loss on Ignition	No blackening should occur and no offensive odor should be developed.
Oxygen Consumed	2.0 parts per million
Chlorine	15.0 parts per million
Nitrogen as Free or Saline Ammonia	0.02 part per million
Nitrogen as Albuminoid Ammonia	0.05 part per million
Nitrogen as Nitrites	0.001 part per million
Nitrogen as Nitrates	15.0 parts per million

The formation of a reasonable and just opinion regarding the wholesomeness of a water requires that *all* of the data of the analysis be taken into consideration, together with the history of the water; the nature of the source; the character of the soil and earth or rock strata; and the surroundings. This is a task for the expert, and the purpose of this sheet is merely to present to the layman such information, touching the evidence and the line of argument, as shall aid him to an understanding and appreciation of the conclusion or opinion and advice which is given him concerning the water supply in which he may be personally interested.

THE GEOLOGY OF ILLINOIS AS RELATED TO ITS WATER SUPPLY,

BY

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UNIVERSITY OF ILLINOIS.

INTRODUCTION.

As it would be impossible in the space assigned me to enter into a detailed description of the geological forces which have made our state what it is, and as many of my readers have not been able to take a course in modern geology, I have thought that it might be helpful to place here, in a few concise sentences, some ideas, now generally accepted by leaders in the science, which have a direct bearing on the history of our state.

GEOLOGICAL CONCEPTS.

1. All Illinois rocks were formed when this part of the earth's surface was beneath the sea, of materials carried in suspension or solution by streams from some dry land area.

2. Sediments deposited on the bottoms of shallow seas gradually sink into the earth as a weight would sink into a ball of plastic clay; hence layers of great thickness may be formed, all of whose ingredients were deposited in shallow water.

3. When coast lines remain stationary for long periods, great quantities of sediment are deposited in a comparatively narrow belt along the shore, but little being carried into deep

water. In this case the older layers will gradually settle in the center as newer ones are laid down, and in the end a solid half cylinder composed of concentric layers will be formed. (See trough spoken of below.)

4. The earth is solid from center to circumference, its interior is very hot, and the whole earth is continually growing smaller, shrinking from loss of heat. As the outside layers receive heat from the sun, and do not shrink as fast as the interior, they must buckle or be thrown into folds and depressions. These folds and depressions are sometimes hundreds of miles in breadth, sometimes narrow like the Ozark ridge in southern Illinois. When folds are formed in a shallow sea the bottom may thus be raised above the surface of the water, and again areas of small elevation may be depressed below sea level.

5. An area which has recently risen from the ocean will have an approximately smooth surface. On such an area a system of water courses will soon be formed. The individual streams will increase in length by pushing their sources further inland, and will throw out branches until the whole surface is covered by a net work. (See Glacial map, southern part.) Rapidly flowing streams erode or cut their beds and gradually sink into trenches, often hundreds of feet deep, of their own construction. Examples: Illinois River, Galena River.

6. All stream beds are trenches. All river bluffs are the sides or walls of such trenches. Sometimes the bluff forms an abrupt bank, but it is often a more or less gradual slope, rising gently to the general level. The top of the bluff is on a level with the surrounding country. As the bed of a stream approaches the level of any flat surface over which it must flow, it stops cutting its bed, begins to wind, and by undercutting the banks widens its trench and develops a flood plain. Rain, frost, and other influences aid the widening. A net work of streams, each widening its trench, will in time reduce the ridge to a series of hills (buttes) separated by broad valleys, and ultimately carry even these away, forming a peneplain. In this way three hundred or more feet of rock have been removed from the entire northwestern part of the state, leaving only a few mounds, Pilot Knob, Scales Mound, Charles

Mound, etc., etc. A similar action has removed hundreds of feet from the Ozark Ridge leaving Bald Knob, Williams Hill, etc. Wherever a hill occurs which is made up of rocks in horizontal layers, we may be certain that its crest represents a former level of the country. Nearly all irregularities in the surface of Illinois are due to stream action.

7. Underground water moves in the direction of least resistance; sloping beds of sand, gravel, sandstone or other porous material when overlaid by denser layers become water ways. When an opening is made from the surface through the impervious to the porous layer, the water will rise in the pipe until its weight equals the resistance which it encounters in continuing its course down the slope. When the resistance to forward motion is absolute, the water will rise to the level at which the porous layer comes to the surface. If the resistance is only partial the water will not rise so high. If the relative elevation of the source and the resistance in front are sufficient, a flowing or artesian well will be formed.

8. Pump wells differ from artesian wells only in the height to which the water is raised. Springs in which the water rises from the bottom are natural artesian wells,

9. Coal beds are usually peat bogs solidified by pressure. The trunks of large trees which grew abundantly about the margins of these bogs usually decayed while lying on the surface and so but seldom helped to form the coal.

10. Fields of ice and snow accumulate whenever the annual heat of the sun is not sufficient to melt the annual snow fall. The thickness of the ice depends only upon the annual surplus and the number of years it has been accumulating. Ice is plastic or behaves as though it were. When masses of ice become very thick their weight causes the lower layers to flow outward, or spread, and this they will continue to do until their edge reaches latitudes where the annual heat can melt the annual supply. Such spreading masses are called glaciers. Glaciers formed in British America have several times spread southward over the northern United States. Three or four of these have covered portions of Illinois.

11. Glaciers pick up fragments, varying from dust particles to pieces tons in weight, of every kind of rock over which

they pass, and when they melt deposit all in a heterogeneous mass.

12. Long ridges which are made up of clay (rock flour) and fragments of various kinds of rocks, as well as isolated mounds or ridges of gravel like those in northeastern Illinois, are usually moraines made by the last (Wisconsin) glacier. (See Glacial map.)

13. Single mounds, clusters of mounds or short ridges like those occurring in Fayette, Bond, St. Clair, and Sangamon counties, when made up of like materials, are fragments of moraines of the first (Illinois) glacier broken by stream action. (See Glacial map.)

14. Thick deposits of clay carrying patches or layers of sand and gravel and containing stones of many different kinds may be considered as belonging to the ground moraine. Such deposits often aggregate two hundred and fifty or more feet in thickness, as at Bloomington, Champaign and Gilman.

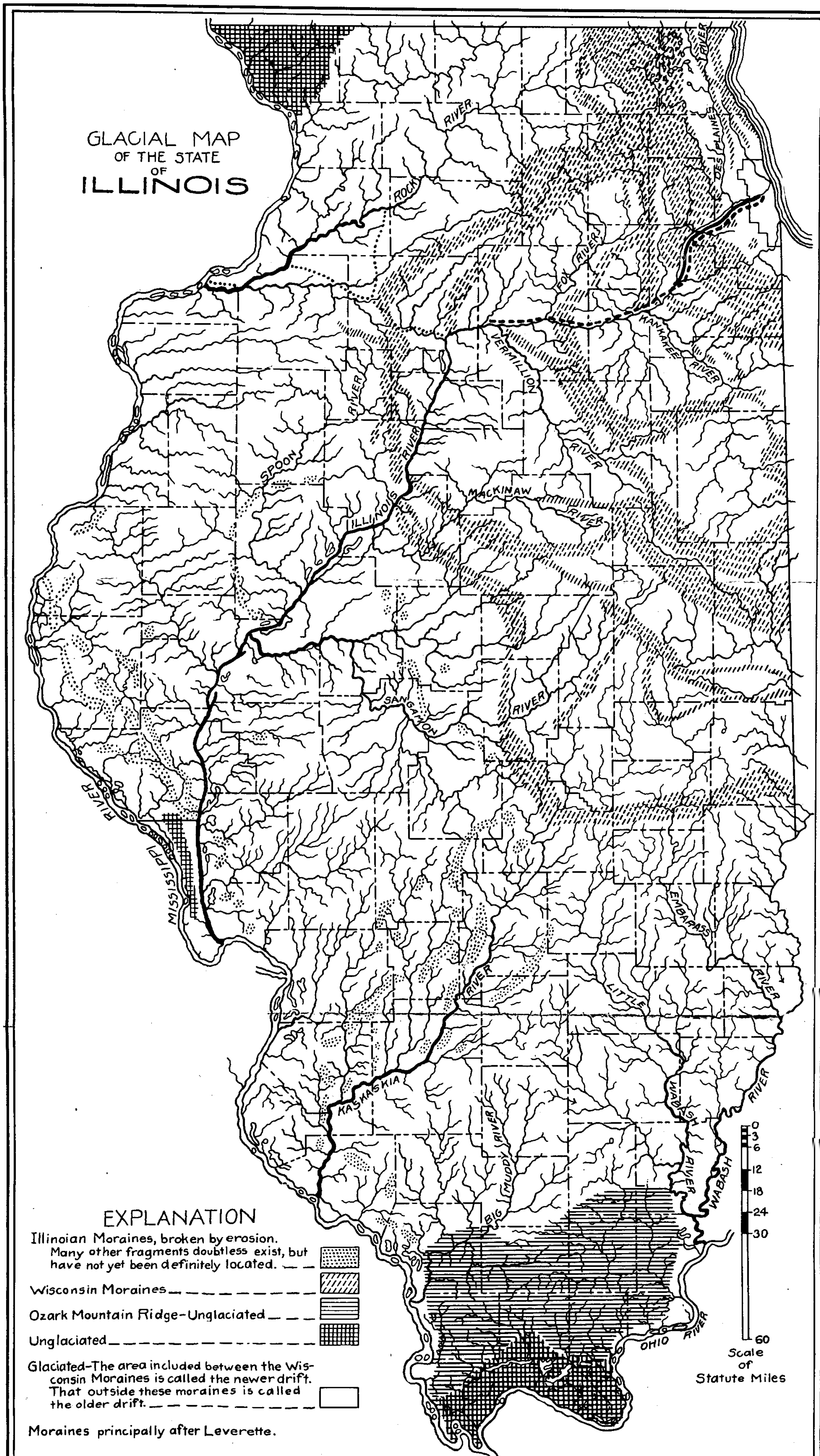
15. In localities underlaid by a heavy ground moraine the enclosed patches of sand and gravel are the main sources of water supply for both artesian and pump wells.

AN OUTLINE OF THE GEOLOGY OF ILLINOIS WITH REFERENCE TO ITS WATER SUPPLY.

Geologists believe that at the close of Archean time the portion of the earth's surface covered by the state of Illinois was, and had been for a very long period, part of a dry land area; that its surface was made up of crystalline rocks, and that this surface was everywhere cut and seamed by the large, deep valleys and minor water courses of a well established drainage system. (See Introduction 1-6.)

The opening of Paleozoic time found this land mass slowly sinking. By or before the middle of the Cambrian era it was completely covered by the ocean (Introduction 4), and the sediments derived from other land masses were being deposited upon it, covering the whole area with a mass of alternating layers (sand stones, shales, and limestones), known as the Potsdam formation, whose average thickness in this state is unknown, but can hardly be less

Plate II.



To face page 44.

than fifteen hundred or two thousand feet. (Introduction 1, 2.) This formation does not appear at the surface within the area of our state, being completely covered by subsequent deposits. Its sandstone layers constitute our deepest sources of artesian water. (Introduction 7, 8.)

The submergence of the entire area by the waters of a very shallow sea continued during the whole of the Lower and Upper Silurian ages, with the exception of a brief emergence at the close of the Calciferous epoch. (Introduction 4.) There is not sufficient evidence from deep borings to enable us to decide whether this emergence affected the entire area of the state, but we know that it did affect the northern portion and continued long enough to permit the establishment of a well developed drainage system, the presence of the divides and valleys of which will account for the widely varying thickness of the following (St. Peters) formation within small areas. (Introduction 5, 6.)

During the above mentioned submergence, there were laid down over the entire area of the state (1) The Lower Magnesian Limestone (Calciferous), a heavy bedded deposit of limestone, occasionally passing into shales, one hundred or more feet in thickness. This formation underlies the whole state but its only outcrop is in the bluff of the Illinois River between Utica and La Salle, where it is used for the manufacture of hydraulic cement.

(2) The St. Peters Sandstone (Chazy), a loosely aggregated bed of unusually pure quartz sand. This formation varies from fifty to three hundred feet in thickness, and is the main reliance for artesian water in the northern part of the state. As the sand was laid down on tidal flats in large part it sometimes encloses deposits of various salts laid down by the evaporation of pools of sea water. These salts are re-dissolved by undèrground water in its passage through the rock, and for this reason the water is oceasionally so charged with mineral matters as to be unfit for use. The St. Peters is usually a very loosely aggregated sandstone, and hence forms an excellent water-way. In certain places, however, it occurs as a compact rock through which water cannot flow rapidly. At such points wells usually fail to give an adequate supply. (Introduction 7, 8.) It outcrops in the valley of the Illinois

between Ottawa and La Salle; in the Rock River valley near Oregon; and near the southern point of Calhoun county at Cap-au-gres. The wide variations in the thickness of this formation are due to the fact that it was laid down on an irregular surface produced by erosion during the emergence spoken of above. The places where the formation is thickest represent old river valleys, while the thinner portions lie on the divides. (Introduction 5, 6.) The Lower Magnesian and St. Peters together constitute the Canadian group. (See Geological map.)

(3) The Trenton, a massive bed of limestone divided into three portions known as the Buff, Blue, and Galena limestones with an aggregate thickness of two to four hundred feet. It forms the surface rock over most of the counties Jo Daviess, Stephenson, Winnebago, Boone, Ogle, Lee, Carroll, and considerable portions of Whiteside, Bureau and La Salle, but underlies the whole State, outcropping also in small areas in Calhoun, Monroe and Alexander counties, where it is brought up by faults. (See Geological map.) This formation encloses the lead deposits of northwestern Illinois, and carries oil and gas in Ohio and Indiana. While there are abundant evidences of the presence of oil and gas in the Trenton of Illinois, the geological structure of our State makes the presence of large deposits connected with this formation very improbable.

(4) The Cincinnati (Hudson River,) a shaly limestone or coarse shale with occasional layers of porous sandstone, from fifty to two hundred feet in thickness, which covers the surface in portions of Boone, DeKalb, Ogle, Lee, Whiteside, Henry, Bureau, Kendall, Grundy, Will, Kankakee, and Ford counties, with small outcrops in Pike, Calhoun, Union, and Alexander counties. In the village of Montgomery just south of Aurora, Kane county, the sandy layers of this formation supply the artesian water which, under the names of Aurora Magnesia and Aurora Lithia water, is so largely sold in Chicago. The supply is probably derived from rain which falls on the outcrop in DeKalb county. (Introduction 7, 8.) The Cincinnati originally covered the same area in the northwestern part of the state as is outlined for the Niagara below, but like it has been removed by erosion. It underlies the remainder of the state. (See Geological map.)

(5) The Niagara, a heavy bedded limestone, valuable for building stone, with quarries at Batavia, Aurora, Naperville, Lemont, Joliet, Kankakee, and Grafton, formerly covered the entire northern portion of the state, but has been largely eroded over most of the area indicated above as having rocks of the Trenton and Cincinnati series at the surface, leaving only scattered masses in the form of mounds or elevated plateaus to tell of its former presence. (Introduction 5.) It now occurs as a surface rock only in the northeastern portion of the state, Lake, McHenry, Cook, Dupage, Kane, and most of Will, Kankakee, Iroquois, and De Kalb counties, with small areas in Calhoun, Jersey, and Alexander (see Geological map,) except as noted above.

At the close of the Upper Silurian era the whole northern part of the State, as far south as the Illinois River and extending on the east to the south line of Ford county, was elevated into dry land, and with the exception of a narrow margin at the south has not since been covered by the sea. This area now lies on the eastern slope of a low anticline, and the rocks dip toward the east at the rate of perhaps three or four feet to the mile. (Introduction 4.)

Shortly after, or perhaps contemporaneous with this uplift, a great trough (geosyncline) began to form, with its axis lying in a line beginning near La Salle, and running southeast, with slight curvature to the west, to a point near the southeastern corner of Wabash county, where it leaves the state. (Introduction 2,· 3.) During the formation of this trough, the deposit of sediment kept its surface approximately level. Hence, the Subcarboniferous and Coal Measure strata (we do not know about the Devonian) increase in thickness rapidly as they approach its axis, attaining a thickness of more than eighteen hundred feet at Champaign, and more than three thousand feet at Tuscola and Paris.

Considering now that portion of the state limited roughly by the parallels of La Salle and Carbondale, we have the rocks heretofore described, lying in the form of a great trough or a half cylinder. The various formations appear at the surface near the east and west boundaries of the state, and descend to a depth of over three thousand feet near the axial line of the trough.

Within this area, wherever prospecting has been carried deep enough, the Devonian formation, which consists of a mass of dark or black shale, with or without a corresponding layer of exceedingly pure limestone, and which attains a thickness of thirty to one hundred feet, has been found lying directly on the Niagara. This formation outcrops near Rock Island, at Cap-au-gres in Calhoun county, and in Alexander county, but the outcrops cover only a small area in each case. It forms the floor on which the coal measures rest along the northern boundary of the area. It is not known whether this formation increases in thickness as we approach the axis of the trough, because the deepest borings in this part of the state have not reached its surface. (See geological map.)

Immediately above the Devonian lies the massive Subcarboniferous formation, composed of sandstones and shales, with more or less limestone below; thick beds principally of limestone which become shaly as we approach the eastern border of the state, in the center; and alternations of limestone and sandstone above. This formation outcrops along the western boundary of the state from Mercer county in the north to Jackson county in the south, attaining an average thickness of perhaps five or six hundred feet,—about one hundred in the north and perhaps twelve hundred or more in the south. Its thickness increases toward the east, reaching more than two thousand feet near the axis of the geosyncline, and its subdivisions shingle out toward the northwest. As the Subcarboniferous outcrops in the Ozark Ridge, and is thus carried above the general level, its sandy or porous layers, in connection with the conglomerate which lies at the base of the Coal Measures, form the main source of artesian water in the southern part of the state. (Introduction 7, 8.)

At the close of the Subcarboniferous the area under consideration was elevated into a series of marshy plains interspersed with islands—like highlands and ridges, and oscillated between this condition and one of slight submergence for a very long period (Introduction 4) during which thick deposits of shale and sandstone with occasional and local beds of limestone were accumulated. Intercalated in these shales and sandstones are many lens-shaped or flattened cylindric deposits of coal, accumulated in basins of elongated swampy areas (Introduction 9.) In these basins mosses and other water-loving plants grew in abundance and formed thick beds of peat, while all around the margin of the marshes grew club mosses, scouring rushes, and ferns, of the size of forest trees, and on the higher and drier areas were forests of conifers. The coal was made principally from the peat. Club mosses, scouring rushes, and ferns contributed leaves and small branches with an occasional tree trunk, while the conifers furnished only leaves and fruits. Whatever materials fell upon, and were incorporated into the vegetable debris of the marshes, helped to form coal, while that which fell upon higher ground decayed as do the materials of our forest today. It is for this reason that coal was formed only in the marshy areas of that period, and for this reason also that coal from different parts of the same basin varies so widely in the amount of ash which it carries, because the wash of the higher lands would be caught and retained by the mosses near the shore of the marshes and so would rarely reach the center, where the deposits of purest coal are usually found. Irregularities in the bottom of the old marsh are marked by "hog backs" which rise from the bottom and partially or entirely cut out the coal bed, while the beds of streams which crossed the marsh are indicated by V's which descend from the roof. Each submergence covered the deposits already formed, and each emergence formed new basins and marshes in which other deposits accumulated.

Professor Worthen tried to arrange these basins in sixteen identifiable horizons, each marking a period of general submergence. He numbered the horizons 1-16, beginning at the bottom. This attempted grouping probably has little value, for it is all but certain that this area was in continual movement, sometimes upward, sometimes downward, as are portions of the western coast of Italy today, and it is practically impossible that the whole area should have been submerged at any one time, or that all parts should have been marshy at the same time. The coal measure deposits attain a thickness of twelve hundred or more feet along the axial line spoken of above (Introduction 2, 3,) but thin rapidily toward the east and west, disappearing entirely, except in one or two points, at some distance east of the western margin of the state. Near the close of the Coal Measures this area became dry land and has not since been invaded by the sea.

During the early part of the Coal Measures an east-west ridge, formed by the upward arching of the Subcarboniferous and the Basal Conglomerate of the Coal Measures, began to rise along the southern margin of this area. (Introduction 4.) (See Geological map.) This ridge has suffered large erosion during the intervening period, but still has peaks which reach an altitude of more than one thousand feet above tide (Williams Hill, Pope county, 1046 feet; Bald Knob, Union county, 985 feet) or five to six hundred feet above the surrounding land. (Introduction 5, 6.) It probably forms a part of the Ozark uplift, and hence is called the Ozark Ridge or Ozark Mountains.

During the whole of Mesozoic, and part at least of Tertiary times, the Atlantic sent a broad, but gradually narrowing, gulf northward to the southern slope of the Ozark Ridge, and rocks were laid down of whose thickness and character we know very little, as the area contains very few natural sections and not many borings have been put down.

All the rocks described above were deposited in seas of no great depth, and often during this deposition portions of their surface were above water. At such times shallow pools would be left without connection with the ocean. The water would evaporate and whatever salts it contained would be deposited with the other rock material. When a well is sunk the water in order to reach it must often pass through these salt beds. The salts are dissolved and the water tainted. The word salt here does not refer to common salt alone, but to all substances which are dissolved in sea water.

The shallow waters teemed with organisms whose bodies after death were buried in the accumulating rock material. The decomposing flesh gave off hydrogen sulphide as a gas, which bubbling up through the water, took possession of such dissolved bases as it came in contact with, and deposited them as sulphides among the rock fragments. Most rocks contain more or less sulphides (iron pyrites, galena, blende, etc.) After the rocks have been elevated into dry land, rock water often carries acids strong enough to displace the hydrogen sulphide and it flows away in solution, to appear again as sulphur water in our springs and wells. Oxygen also converts sulphides into sulphates which dissolve in the water. In a similar manner rock water may be impregnated with any one of many mineral substances found in the rocks.

Underground water often flows more rapidly through stratified rocks than through loose material (Introduction 7,) because the numerous joints offer relatively small resistance to movement of the greater portion, while the pores of the rocks themselves permit a slow movement of the rest. It is or this reason that where rock strata reach or come near to the surface, contaminating influences are much more likely to be widely spread, and to injuriously effect the drinking water of the region, than is the case where the surface material has not been solidified into rock.

Subsequent to the elevation of the entire area of the State into dry land, and after the lapse of a very long period during which surface streams became numerous and ran in deep channels which they had formed for themselves, establishing a perfect drainage system and cutting the surface up into a series of ridges, watersheds, and stream valleys (Introduction 5, 6,) an ice sheet, called the Illinoian Ice Sheet, appeared in the north and slowly pushed its way southward to the latitude of the Ozark Ridge. (Introduction 10.) This glacial advance was not accomplished by a steady southward movement, but rather by a series of oscillations backward and forward, according as the rate of melting exceeded or fell short of the rate of advance. The ice sheet carried great quantities of rock flour, bowlders and other materials which it had picked up as it moved southward from Ontario and Manitoba (Introduction 11.) and whether this ice front was advancing or receding, it was continually depositing this debris as it melted, forming a ground moraine, thick in the valleys thinner on the old divides.

In this way the glacier pushed forward, depositing a thick layer of sediment, until its southern limit, described above, was reached when it began to retreat, The retreat was marked by the same oscillations of movement as the advance. Sometimes these oscillations were short, and the backward and forward movements depositing layer upon layer of debris, resulted in the building up of a ridge of greater or less altitude (occasionally one hundred feet or more above the surrounding country) called a terminal moraine. (See Glacial map.)

Again the retreats would be long, laying bare broad areas called ground moraines, whose surface sloped from the terminal moraine to the ice front. The surface of glacial deposits is always uneven; hence this area would soon be covered with series of lakes or ponds connected by streams which begin on or near the terminal moraine and extend downward toward the ice front. In some parts of these, rapidly moving currents would quickly pick up and carry away the loose material over which they flowed, until coming into the broader and more sluggish lake waters, they would lose velocity and be compelled to deposit the heavier particles of their load, building up in this way beds of sand and gravel often many feet in thickness. In other parts a slowly moving stream unable to carry the heavier particles which formed its bed and banks would pick up the finer rock flour and bear it away leaving a shallow layer of sand and gravel upon its bed. Thus connected series of porous deposits would be formed reaching from the ice front upward to the crest of the moraine.

The next advance of the glacier would cover these with a layer of compact material, and they would thenceforth be pockets of pervious material enclosed in more impervious drift. A series of long oscillations, each retreat depositing a layer of drift material, upon which was developed series of strings and patches of gravel, which in turn were covered with a layer of drift by the next advance, would form a thick ground moraine, having pockets of water-bearing gravels scattered here and there at many horizons.

Driven or bored wells drawing their supply from these pockets of sand or gravel are subject to contamination only from sources of pollution situated on or near the outcrop—a limited area on the flank of the moraine. If the distance from this moraine be considerable, any organic matter entering at the outcrop will probably be oxidized and rendered harmless before reaching the well. Dug wells, on the contrary, usually pass through thin layers of sand and gravel before reaching one sufficiently large to furnish the needed upply. The outcrops of these thin bands are often not far distant from the well, and any source of pollution at or near these outcrops is liable to seriously affect the character of the water.

The fact that the water of a given well is unfit for use is not presumptive evidence that other wells in that immediate vicinity are bad. They may draw their supply from other pockets, and the outcrops of these different pockets are almost certain to be so widely separated that they are not subject to the same sources of contamination.

There is no relation between the depth of wells and the purity of their water, except that the gravel of the deeper well usually has the more distant outcrop, and hence if equal sources of pollution exist at each outcrop, the deeper well would be more likely to have its contaminating influences oxidized, but very shallow wells often draw their supply from pockets whose outcrops are so situated that they are not liable to contamination and so supply the purest of water, while the reverse is occasionally true of deep wells. The fact that the ground moraine contains gravel beds at different horizons explains why wells in the same neighborhood often differ so widely in depth.

The Illinoian Ice Sheet retreated in the manner indicated, leaving terminal moraines at its various resting places, and between them a ground moraine which averages perhaps fifty feet in thickness (this deposit was, of course, thicker in the preglacial valleys and thinner on the divides) until it had passed beyond the limits of the United States, and possibly disappeared from British America also. (See Glacial map, Illinoian Moraines.

Then there seems to have followed a long interval with climatic conditions not unlike the present, during which (1) numerous water courses were formed, excavating a network of deep channels for themselves (Introduction 5, 6, and often cutting through the moraines and dividing them into a series of short ridges, which in many cases have since been cut up into clusters of mounds, like those near Hillsboro, Montgomery county; (2) the blue glacial clays were leached to the depth of several feet, losing much of their lime, becoming porous and of a yellow color; (3) soils were formed—black soils in the swamps and lake beds, lighter ones on the higher lands, and (4) the surface was covered with vegetation, much of it with forests.

In many of the lakes where sufficient current existed to carry away the finer material, beds of gravel many feet in thickness accumulated, some of which covered square miles in area. Other beds of gravel, forming long lines or ridges often of great thickness, were laid down by the outwash from beneath the glacier. All these and other masses of sand and gravel, accumulated in a somewhat similar manner, form excellent storage for water when covered by subsequent glacial deposits. Many cities of central Illinois, some of which have a population of fifteen thousand or more, draw their water supply from such beds. In well sections in the northeastern part of the state this horizon may usually be recognized by the occurrence of one or more of the following phenomena: beds of leached yellow clay, large nearly horizontal beds of gravel, deposits of natural gas, or black soil.

During this interglacial epoch, and before the changes enumerated above were fully perfected, a second ice sheet, the Iowan, appeared in the northwest, and advanced over Stephenson, Ogle, Lee, and some portions at least of adjoining counties. Its exact boundaries have not been determined. (Introduction 10, 11.) On its disappearance it left a sheet composed of terminal and ground moraines similar in all respects to those of the Illinoian drift. The junction of the Illinoian and Iowan drift is marked by phenomena similar to those indicated above. (Leverett.)

After the retreat of the Iowan sheet there was another long interval during which changes in its surface similar to those described under the Illinoian sheet were produced. Then, a third ice sheet, the Wisconsin, advanced (Introduction 10, 11,) this time following the valley of Lake Michigan, but spreading broadly to the west so that it covered about one-half of the width of the state at its northern boundary. This sheet advanced southward until it extended over all the portion lying north and east of a line running roughly through Belvidere, Amboy, Peoria, Clinton, Decatur, Shelbyville, and Charleston. This line is marked by a strong terminal moraine lying near these towns. (See Glacial map, Wisconsin Moraines.) During its retreat it deposited a series of ground and terminal moraines whose average thickness is perhaps fifty feet, but as the sheet was deposited on a surface on which a nearly complete drainage system had been established (Introduction 5, 6,) its depth varies greatly, often reaching one hundred and fifty or more feet in the interglacial valleys and being reduced to a very few feet on the interglacial divides. The junction between the Illinoian and Wisconsin drift is usually strongly marked by the occurrence of such phenomena as were described above. (Page 54.) A similar but less plainly marked parting exists between the Iowan and the Wisconsin. (Leverett.)

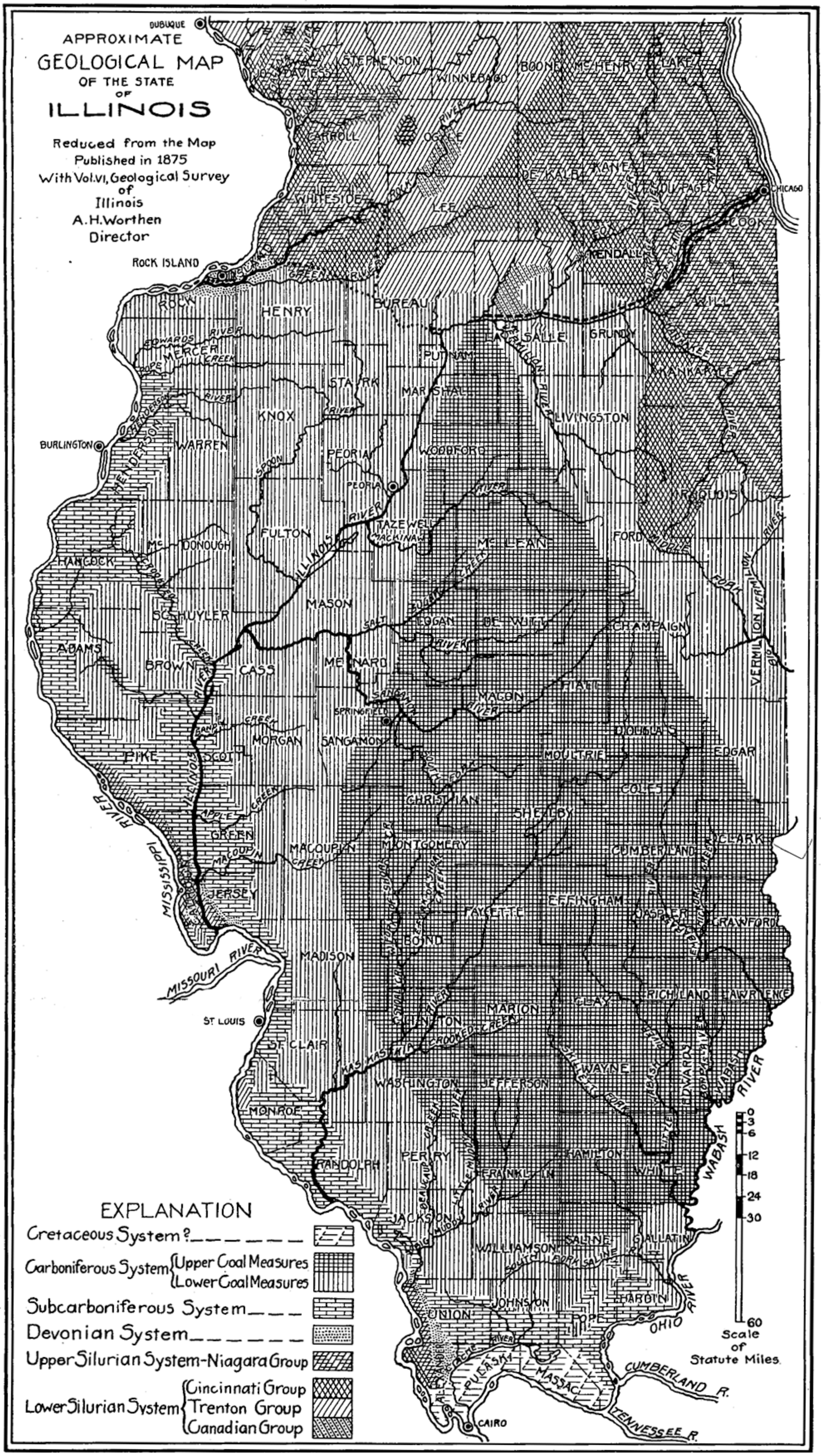
The retreat of the Wisconsin sheet was so recent that its terminal moraines still generally retain their ridge-like character. (See Wisconsin Moraines, Glacial map.) The drainage system is very incomplete. The main streams are not fully developed and have few branches. The country has hardly emerged from the swampy condition induced by imperfect drainage. The black soil accumulated in lakes and swamps has not yet been removed, and the whole area appears level and flat, although it really presents as great variety in altitude as the apparently much rougher country outside, if we disregard the immediate effects of stream action in the latter areas. These characters are much more evident in the southern portion of this area, where the moraines are widely separated, than in the northern, where they are crowded together. North and east of each moraine formed by the Wisconsin glacier, the soil tends to grow deeper and blacker, because the moraine acted as a dam, holding back the natural drainage and producing a lake in which large quantities of vegetable debris mixed with clay accumulated. The level of the water in the former lake may sometimes be traced on the moraine by an abrupt change in the character of the soil.

When the moraine is prominent or ises considerably above the general level, flowing wells are frequently struck in the area covered by the old lake bed, which draw their supply entirely from the annual rainfall upon the moraine. The water sinks into the outcropping gravel beds described above, and as the surface of the lake bed is lower than the moraine and there is no escape from the pocket, the water rises to or above the surface. (Introduction 12.)

Outside the Shelbyville moraine all this is changed. The moraines of the Illinoian Ice Sheet are broken up into short ridges or clusters of mounds. (Introduction 13.) The streams have many small branches. (See glacial map.) A fairly complete drainage exists. The black soil has mostly disappeared. The surface presents a series of broad shallow V shaped valleys, with perhaps a sharper V forming the immediate channel of each stream, the larger valleys being separated by sharp, or flat but narrow, divides. In short the surface of this area has the characteristics of maturity, while that within the moraine is evidently in the formative stage. The change is abrupt and marked as we pass from one area to the other, but nature's forces are still at work and in time will reduce the area within the Shelbyville moraine to the same condition as that outside. Man, by underground drainage, has interfered with and may delay this outcome for centuries, but nature is more powerful than the resistance offered and will surely triumph in the end.

C. W. ROLFE.

Plate III.


APPROXIMATE
GEOLOGICAL MAP
OF THE STATE
OF
ILLINOIS
Reduced from the Map
Published in 1875
With Vol.VI, Geological Survey
of
Illinois
A. H. Worthen
Director
DUBUQUE
ROCK ISLAND
BURLINGTON
CHICAGO
PEORIA
SPRINGFIELD
ST LOUIS
CAIRO
JO DAVIESS
STEPHENSON
WINNEBAGO
BOONE
McHENRY
LAKE
CARROLL
OGLE
DE KALB
KANE
DU PAGE
COOK
WHITESIDE
LEE
KENDALL
WILL
ROCK
HENRY
BUREAU
LA SALLE
GRUNDY
MERCER
PUTNAM
KANKAKEE
STARK
MARSHALL
LIVINGSTON
KNOX
HENDERSON
WARREN
PEORIA
WOODFORD
IROQUOIS
FULTON
TAZEWELL
McLEAN
FORD
HANCOCK
McDONOUGH
MASON
SCHUYLER
LOGAN
DE WITT
CHAMPAIGN
VERMILION
ADAMS
BROWN
CASS
MENARD
PIATT
MACON
DOUGLAS
PIKE
SCOTT
MORGAN
SANGAMON
MOULTRIE
EDGAR
CHRISTIAN
SHELBY
COLES
GREEN
MACOUPIN
MONTGOMERY
CUMBERLAND
CLARK
JERSEY
FAYETTE
EFFINGHAM
JASPER
CRAWFORD
BOND
MADISON
MARION
CLAY
RICHLAND
LAWRENCE
CLINTON
ST CLAIR
WAYNE
WASHINGTON
JEFFERSON
EDWARDS
WABASH
MONROE
RANDOLPH
PERRY
FRANKLIN
HAMILTON
WHITE
JACKSON
WILLIAMSON
SALINE
GALLATIN
UNION
JOHNSON
POPE
HARDIN
ALEXANDER
PULASKI
MASSAC
MISSISSIPPI RIVER
MISSOURI RIVER
ILLINOIS RIVER
ROCK RIVER
WABASH RIVER
OHIO RIVER
CUMBERLAND R.
TENNESSEE R.
KANKAKEE RIVER
SANGAMON RIVER
KASKASKIA RIVER
EXPLANATION
Cretaceous System?
Carboniferous System { Upper Coal Measures
Lower Coal Measures
Subcarboniferous System
Devonian System
Upper Silurian System-Niagara Group
Lower Silurian System { Cincinnati Group
Trenton Group
Canadian Group
0
3
6
12
18
24
30
60
Scale of Statute Miles

SANITARY CHEMICAL EXAMINATIONS

OF THE WATERS OF

THE ILLINOIS RIVER

BEFORE AND AFTER THE OPENING OF THE

CHICAGO MAIN DRAINAGE CHANNEL.

In organizing the work of the Water Survey in the Autumn of 1895, it was decided to devote as much attention as was practicable to the investigation of the condition of the Illinois River. To this end, arrangements were made for the collection and examination of samples of water from the Illinois River at several points between its origin, at the junction of the Desplaines and the Kankakee near Morris, and its discharge into the Mississippi at Grafton. At the same time provision was made for the collection and analysis of water samples from Lake Michigan at Chicago, from several of the larger tributaries of the Illinois, and from the Mississippi River above and below the mouth of the Illinois.

The series of examinations begun at this time have, with some minor changes as to places of collection, been more or less continuously prosecuted until the present. Owing to the meager financial support afforded to the Survey and the press of other important investigations concerning the water supplies of the State, the discontinuance of a portion of the work upon the Illinois River was contemplated early in 1899, but at this juncture a proposition from the Honorable Arthur R. Reynolds, M. D., Commissioner of Health of the City of Chicago, led the Board of Trustees of the Chicago Sanitary District to make provision for an extensive series of examinations of these same waters, a part of which work was carried on here in connection with the work of the Water Survey.

The results of the work done here on behalf of the Chicago Sanitary District are to be published by the Trustees of the District and are not included in detail in this report, but because of their close connection with our own investigations, which they at certain points of time and place overlap, they are sometimes referred to, and some of the general conclusions which are stated in this report are based in part upon data which were obtained in the work done for the Chicago Sanitary District. This relates particularly to references to the condition of the several streams at points where examinations were made on behalf of the Sanitary District but not primarily as part of the Water Survey investigation; Henry, Wesley City, Pekin, Beardstown upon the Illinois River; Chain of Rocks upon the Mississippi; West Alton upon the Missouri, and Bridgeport upon the Illinois and Michigan canal, being cases in point.

THE ILLINOIS RIVER* is formed by the confluence of the Desplaines and the Kankakee Rivers at a point ten miles northeast of Morris and fifty-two miles southwest of Chicago.

THE DESPLAINES, rising in the southeastern extremity of Wisconsin, flows south, generally at a distance of about twelve miles from Lake Michigan, to the vicinity of Chicago sixty-two miles, thence southwesterly about forty-two miles to its junction with the Kankakee. Its normal water supply comes largely from marshy districts, but its flow is extremely variable,† because of the very rapid run-off in times of heavy rain or sudden thaws. Its waters are charged with organic matters from marshes and in late years its upper section receives considerable local sewage from suburbs of Chicago.

At and below Lockport, it has for many years been seriously polluted by the discharge of Chicago sewage from the Illinois and Michigan Canal, and it also receives most of the sewage of Joliet.

THE KANKAKEE RIVER rises to the west of the middle of the northern border of Indiana, and flows in an extremely

* See map of the Illinois River basin opposite page 60.
† See Discharge curve for 1900, plate xxxvii, and for 1901, plate xxxviii.

sinuous course but in a generally westerly direction to its confluence with the Desplaines. About two-fifths of its watershed area of 5,146 square miles consists of swamps and marshes, and its waters contain considerable organic matters derived from marsh vegetation. No very large towns are situatedupon its watershed, and the quantity of sewage discharged into it is comparatively inconsiderable, that of Kankakee, the largest town (pop. 1900, 13,935) being the most important.

Gaugings* and estimates of the discharge of the Kankakee River at its mouth indicate that the range is between 420 cu. ft. per second and about 30,000 cu. ft. per second; the mean flow being probably about 5,000 cu. ft. per second, and ordinary low water flow, 1,300 cu. ft. per second.

From the junction of its two head water streams, the Illinois flows almost due west to the neighborhood of Hennepin about sixty miles, then turns abruptly to the south and follows a southwesterly course about 196 miles to its mouth, a total length of 256 miles. Throughout much of its course the stream consists of a series of wide expansions or pools, alternating with narrower stretches. In the alluvial section of the river, which extends from Utica, about nine miles below the mouth of the Fox, to the Mississippi, nearly 220 miles, the numerous lakes, pools, bayous, swamps and sloughs, together with the extensive lowlying bottoms, many of which in time of high water are flooded to a breadth of one and a half to six miles from the channel, serve by their storage capacity to retard and equalize the flow and constitute a very important factor in affording time and opportunity for the progress of processes involved in the natural purification of the waters of this stream.

THE FOX RIVER.—The largest tributary of the upper Illinois is the Fox River, which rises in. the lake region of Waukesha County, Wisconsin, just west of Milwaukee; in its upper course it is largely fed by lakes and by swamps and marshes, much as is the Kankakee. Several manufacturing towns, the largest being Elgin (pop. 1900, 22,246) and Aurora (pop. 24,147), dis-

*L. E. Cooley, State Board of Health preliminary report, 1889, pages 79-80, and J A. Harmon, S. B. H. report, 1901, page 131.

charge sewage directly into the stream. It unites with the Illinois at Ottawa, thirty-five miles below the junction of the Kankakee with the Desplaines. The flow varies in volume much less than do the flows of the Desplaines and the Kankakee, but the extreme range is between 525 and 13,680 cu. ft. per second.*

The tributaries of the lower Illinois are, as to volume of flow, much more variable than the head water streams. In times of drouth most of them go nearly, if not entirely, dry. The largest of them, the Sangamon, with a drainage area of 5,670 square miles, goes almost dry nearly every autumn, but in times of freshet, floods its extensive bottoms for several miles in width. The run-off is rapid, and except in times of prolonged heavy rain fall, high water continues for but short periods. The sewage of several towns is discharged into the Sangamon, notably that of Springfield (pop. 34,159, 1900), which enters about sixty-five miles above its mouth.

The watershed areas of the more important tributaries are given in the following table in which the total area drained by each tributary is shown in Column I, and the total area to the mouth of each tributary is shown in Column II.

WATERSHED AREA OF THE ILLINOIS RIVER.

† STREAM.	I. AREA.	II. TOTAL AREA
Desplaines	1,392	....
Kankakee	5,146	6,583
Fox	2,700	10,229
Vermilion	1,317	11,682
Mackinaw	1,217	15,048
Spoon	1,870	17,454
Sangamon	5,670	23,264
Crooked Creek	1,385	24,829
Macoupin Creek	985	27,761
Total square miles	21,682	to mouth. 27,914

It is evident from the table above that the nine more important tributaries drain an area 21,682 square miles, while the area, drained by the smaller tributaries and that drained directly to the main stream amounts to 6,232 square miles.

*The Lakes and Gulf Waterway, Lyman E. Cooley, p. 52, Low water September 27, 1867,—31,539 cu. ft. per min.; p. 50, Flood February, 1887,—13,680 cu. ft. sec.

†The data of this table are taken from the report of Lyman E. Cooley in the preliminary report of the State Board of Health of Illinois, published in 1889.

Points at Which Samples Were Taken for Analysis.

1. Lake Michigan at Chicago: Samples were taken from a tap at No. 465 State Street; the water at this point comes from the four mile crib opposite 14th Street.

2. Illinois and Michigan Canal at Lockport: Samples were taken just above the town.

3. Desplaines River at Lockport: Samples were taken just above the old stone bridge.

4. Sanitary Canal at lockport: Samples were taken just above the controlling works at the Bear Trap dam.

5. Desplaines River at Joliet: Samples were taken near the middle of the stream just above the dam; later, two samples were taken, one at each side of the stream above the dam.

6. Kankakee River at Wilmington: About nine miles above the mouth.

7. Illinois River at Morris: Samples were taken at the bridge.

8. Illinois River at Ottawa: Samples were taken at a point about one mile above the mouth of the Fox river.

9. Fox River at Ottawa: Samples were taken just above the aqueduct which carries the Illinois and Michigan Canal over the Fox River.

10. Illinois River at La Salle: Samples were collected beside the wagon bridge, above the point at which the sewage of La Salle enters the river and about three miles below the mouth of the Big Vermilion

11. Big Vermilion River at La Salle: Samples were collected about one half mile above the mouth of the stream, three miles above La Salle.

12. Illinois River at Averyville (North Peoria:) Samples were collected at the bridge at the narrows, three miles above the Peoria Court House and far above any discharge of Peoria sewage.

13. Illinois River at Havana: Samples were collected at a point above the mouth of the Spoon river and above the mouth of Quiver Lake.

14. Spoon River at Havana: Samples were collected about a half mile above the mouth of the stream.

15. Illinois River at Kampsville: Samples were collected just above the United States Government Dam.

16. Illinois River at Grafton: Samples were collected two miles above the mouth at a point not reached by Mississippi River water.

17. Mississippi River at Grafton: Samples were collected two miles above the mouth of the Illinois.

18. Mississippi River at Alton: Samples were collected at midstream; later, five samples were collected at as many different points across the stream, one mile above the town of Alton.

19. Mississippi River at Quincy: Samples were collected at midstream at a point near the intake of the Quincy water works and above the point at which any sewage from Quincy enters the river.

In general these series of examinations included the analysis of regular weekly samples collected throughout the respective years. In several cases samples were collected more frequently. In series in which the collections were at times less frequent, the yearly averages have been calculated from monthly averages.

*For the relative locations of these points see map of the Illinois River Basin opposite page 60.

THE POLLUTION AND THE SELF-PURIFICATION.

OF THE WATERS OF THE

ILLINOIS RIVER.

The sources of pollution of the Illinois River include the surface wash from its fertile and populous watershed; the discharges of the sewage and manufacturing wastes of various fair sized towns situated upon its banks or upon the banks of its tributaries, by far the most notable of which are contributed by Peoria and Pekin; and the introduction of Chicago's sewage through the Illinois and Michigan Canal and the recently opened Sanitary Canals.

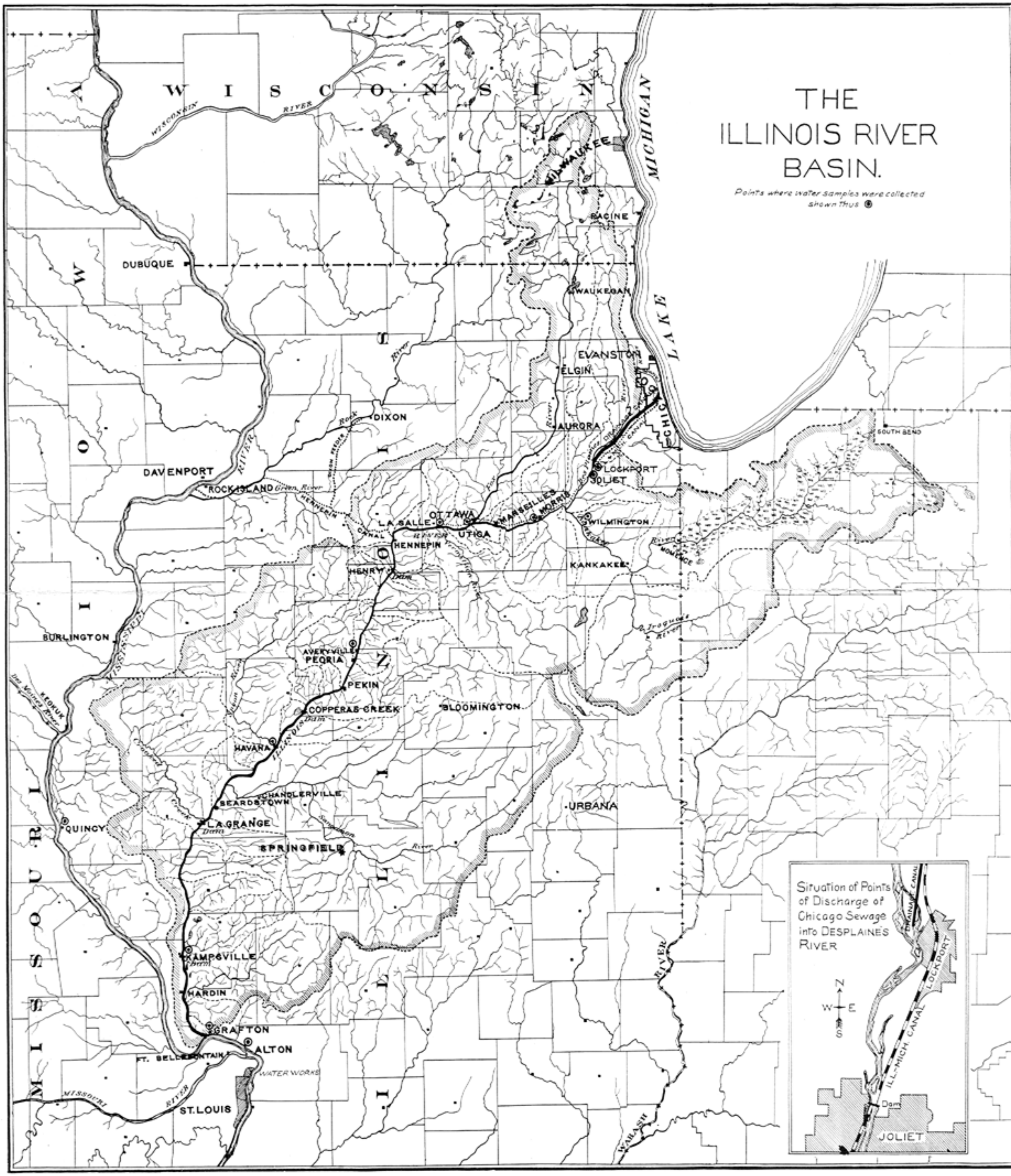
The streams are natural drainage channels, and pollution from the sources indicated is a natural result of the settling of the land and the building of cities; it originates largely in man's wasteful habits and the crudity of his efforts to dispose of the so-called wastes of habitation.

Although in the aggregate the run-off of surface wash probably carries much greater quantities of objectionable substances into this stream than does the discharge of sewage, yet, since this is, in the main, coincident with high water, more attention is in general, directed to the effect of the unusually great dilution thereby effected than to the impurities which are thus introduced.

CHICAGO SEWAGE IN THE ILLINOIS RIVER.

For more than forty years, i. e., since the year 1860, the sewage of the city of Chicago has been in part conveyed through the Illinois and Michigan Canal into the Desplaines River and thence into the Illinois River. The pumping works, capacity 20,000 cubic feet per minute, erected in 1859-60 at the junction of the canal with the Chicago River, were originally established merely for the purpose of supplying the canal with water from the Chicago River in time of drouth, when the ordinary sources of supply failed, and the pumps

Plate IV.



To face page 60.

were kept in operation only during such periods as the interests of commerce upon the canal required a supply of fluid from this source. Incidentally the operation of the pumps effected an occasional flushing and notable purification of the Chicago River.

In 1865, arrangements were made between the Board of Works of the City of Chicago and the Canal Commissioners, to utilize the pumps more extensively for the purification of the river, and they were put in operation at various times when the offensiveness of the river became more than usually unbearable. Pumping was not, however, at this time regarded as an entirely satisfactory or permanent means of securing relief, and in this same year the work of deepening the Summit level of the canal sufficiently to secure a gravity flow from the Chicago River, through twenty-nine miles of the canal to Lockport and thence into the Desplaines River at Joliet, was begun, the city of Chicago assuming the cost.

After six years' labor, this work was accomplished, and in 1871 the first gravity flow from Lake Michigan through the Chicago River, the Illinois and Michigan Canal to the Desplaines River and thence through the Illinois River into the Mississippi was established.

The deepening of the Summit level had been expected to provide a gravity flow of 20,000 to 25,000 cubic feet per minute,* but as the excavation seems to have been incomplete at certain points, it is doubtful whether so great a flow as this was ever secured except in time of freshets. By the year 1876,† the sliding in of the banks and the washing in of silt from the Ogden-Wentworth and other ditches had so filled up the canal that the flow probably did not ordinarily exceed 10,000 cubic feet per minute, and the effect in relieving the Chicago River of its burden of pollution was far less than the needs of the situation required. The city was growing rapidly and the slaughtering and manufacturing industries were enormously increasing, so that notwithstanding the diversion of part of the sewage into the canal, the river became even more and more offensive, and the people of the

*Report of Illinois and Michigan Canal Commissioners 1872, page 42.

†Report of Illinois and Michigan Canal Commissioners 1875, page 3; 1877, pages 35, 36.

city suffered not only from the disagreeable and offensive character of the putrefying contents of an immense stagnant cesspool or septic tank situated in their midst, but in times of freshet or at times when the natural level of the water in the lake was depressed, immense volumes of filth from this source entered the lake and polluted the water which was drawn into the mains for the general supply of the city. Along the lake shore many sewers discharged directly into the lake, but probably no such discharge of ordinary sewage could at all compare in general offensiveness with the discharge of the river.

As the gravity flow had proved to be inadequate, modifications in the canal, including the re-establishment of the lock at its junction with the Chicago River, were effected, and pumps with the nominal capacity for raising 60,000 cubic feet of water per minute from the river into the canal, were erected at Bridgeport and set in operation June 3, 1884. However, these measures were found to be insufficient for the existing needs, and they made no provision for the disposal of the additional sewage resulting from further increase in population and industries.

As a result of investigation and agitation by the Chicago Citizens' Association during the period 1880-1885, and a resolution passed by the city council in January, 1886, a Drainage and Water Supply Commission was appointed by Mayor Harrison. The report of the investigations of this commission and of Dr. John H. Rauch, Secretary of the State Board of Health, led to the passage by the Legislature of the Act of 1889 creating the Chicago Sanitary District, and authorizing the construction of the main Drainage Channel or Sanitary Canal. The work of excavating was formally inaugurated in September, 1892, and during the succeeding seven years the project was so far advanced that the main channel was opened January 17, 1900, since which time from 200,000 to 300,000 cubic feet per minute of the mixture of Chicago sewage and diluting lake water have been flowing through this channel into the Desplaines River valley at Lockport, with the result that the condition of the major part of the Chicago River is very greatly improved, and the offensive character of the discharges into the Illinois River moderated. The conditions in the Illinois and Michigan Canal, from Bridgeport to Joliet, however, remain in certain respects much as they were, because the supply, which, for purposes of navigation, is still pumped into it at Bridgeport, comes from the South Fork, which receives the sewage of the stockyards district, and which, owing to delays in the construction of the 39th Street sewer or conduit, has not yet been flushed out.

The Chemical Examinations.

In discussing the effect of the discharge of Chicago's sewage into the Illinois River we shall first consider, more or less briefly, the character of the water as revealed by the analyses and the local conditions at each point, in consecutive order from the Lake to the Mississippi.

1. Lake Michigan at Chicago.—The results of our chemical examinations of the waters of Lake Michigan drawn from the lake through the 14th Street four mile crib, are shown in detail in the tables upon pages 230-237 inclusive.

The variations during the four years covered in this report were in general but slight and were occasioned chiefly by conditions which caused discharges from the Chicago River and from those sewers which empty directly into the lake, to pass farther out than they commonly do; they are in part due also to storms which stir up the sediments near the shore and the cribs, the sediments being in the main such as are of course natural to any considerable body of surface water, but also including refuse from the city and filth dredged from the Chicago River.

That the lake water is ordinarily fairly well charged with dissolved oxygen is shown by the results of numerous determinations which are exhibited graphically by the curves in Plate XXXIX.

2. Illinois and Michigan Canal at Lockport.—The fluid pumped from the south branch of the Chicago River into the Illinois and Michigan Canal at Bridgeport flows sluggishly for a distance of about twenty-nine miles to Lockport, where the first discharge from the canal into the Desplaines River occurs, the discharge being occasioned by the use of canal water as hydraulic power to run the Norton Mills, situated at this point.

Four miles farther down, the water from the canal discharges directly into the Desplaines River at Joliet, the canal at this point crossing the river by means of a dam and pool.

Before the opening of the Drainage Channel, the liquid pumped into the old canal at Bridgeport constituted the major part of Chicago's sewage. It contained, and still contains, both house sewage and manufacturing wastes; the latter including drainage and refuse from stockyards, rendering establishments, soap factories, metallurgical and chemical works, gas works, etc., etc. Ordinarily no appreciable dilution and no notable additional pollution occurs between Bridgeport and Lockport, but in certain seasons water from ditches and formerly also from the Desplaines River, in excessive freshet, flowed into the canal.

The concentration of this liquid and the nature of the manufacturing and other wastes contained in it is such that no very considerable change in the quantity or the character of the organic matters appears to take place between Bridgeport and Lockport, a fact demonstrated by comparative analyses made by the State Board of Health and others made by ourselves for the Sanitary District of Chicago, the data of which are embodied in the report of the investigations made on behalf of the Sanitary District, and which consequently are not included in this report.

The analyses of the water of the canal at Lockport serve to show the character of the water as it was discharged into the Desplaines valley in part at Lockport, and in part at Joliet, four miles below.

The results are given in the tables upon pages 102-109 inclusive, and upon pages 192 and 193. The data reveal notable variations, generally in April and March, the usual season of freshets, but for most of the year they show a somewhat remarkable uniformity in the proportions of organic matters.

Inspection of the yearly averages, which are brought together in Table III, below, shows that up to the time of the opening of the Drainage Channel there were, in most respects, but slight variations from year to year, such changes as did occur being in the direction of a small but constant increase of the nitrogenous organic matters.

TABLE III.

CHEMICAL EXAMINATION OF THE WATERS OF THE ILLINOIS AND MICHIGAN CANAL AT LOCKPORT, BEFORE THE OPENING OF THE CHICAGO MAIN DRAINAGE CHANNEL. YEARLY AVERAGES. PARTS PER MILLION.

Year	Chlorine	Oxygen Consumed			Nitrog'n as Ammonia				Organic Nitrogen			Nitrogen as	
					Free Ammonia	Albumoid Ammonia.							
		Total	By Dissov'd	By Susp'nd Matter		Total	Dissolved	Suspended	Total	Dissolved	Suspended	Nitrites	Nitrates
1896	119.1	39.2	14.7	24.5	14.99	2.55	1.17	1.38	5.17	2.19	2.98	.007	.195
1897	115.4	38.3	18.1	20.2	12.4	2.72	1.34	1.38	4.94	2.31	2.63	.039	.338
1898	116.8	42.2	19.1	23.1	12.7	2.86	1.48	1.38	5.52	2.5	3.02	.072	.417
1899	135.2	39.5	21.2	18.3	13.9	2.93	1.44	1.51	5.56	2.84	2.72	.013	.217
Av'e	121.6	39.8	18.3	21.5	13.5	2.77	1.36	1.41	5.3	2.46	2.84	.033	.292

Examination of the data of the analyses for the year 1900 upon pages 108 and 109, and those for the year 1901 upon pages 192 and 193, reveal much greater and more frequent variations than occurred before the opening of the Drainage Channel. An inspection of the averages which are brought together in Table IV below, shows that the relative proportions of organic matters were considerably reduced as a result of the diversion of part of the sewage to the new Drainage Channel, though the proportions of nitrogen as free ammonia became greater than before, a result which may be due to the effect of the greater dilution in facilitating the more speedy oxidation of the organic matters.

The variations are mainly due to the fact that at times when the lake is high or the discharge from the Drainage Channel at the controlling works is reduced, comparatively pure lake water backs up into the South Fork in such volume that a more dilute sewage than usual is raised by the pumps into the old canal, while ordinarily, inasmuch as the South Fork is not yet flushed out, the liquid pumped into the old canal still consists of the comparatively concentrated sewage from the Stockyards district.

TABLE IV.

CHEMICAL EXAMINATION OF THE WATERS OF THE ILLINOIS AND MICHIGAN CANAL AT LOCKPORT, AFTER THE OPENING OF THE CHICAGO MAIN DRAINAGE CHANNEL, YEARLY AVERAGES, PARTS PER MILLION.

Year	Chlorine	Oxygen Consumed.			Nitrog'n as Ammonia				Organic Nitrogen			Nitrogen as	
						Albuminoid Ammonia							
		Total	By Dissov'd	By Suspen'd Matter	Free Ammonia	Total	Dissolved	Suspen'd	Total	Dissolved	Suspended	Nitrites	Nitrates
1900	135.	21.	11.5	9.5	12.6	1.77	.77	1.	3.62	1.51	2.11	.022	.272
1901	133.2	18.8	13.7	5.1	17.6	1.16	.7	.46	2.18	1.45	.73	.025	.208
Av'e	134.	19.9	12.6	7.3	15.1	1.47	.735	.73	2.9	1.48	1.42	.023	.24

3. DESPLAINES RIVER AT LOCKPORT.—The Desplaines River itself at Lockport is a small stream of exceedingly variable flow.* Above this point the river receives sewage from various suburban towns. For the purposes of this investigation, effort was made to have the samples collected beside the old stone bridge above the point at which any discharge from the Illinois and Michigan Canal enters the stream but through some misunderstanding of the collectors, it is probable that the samples for 1897 and 1898 were at times collected at some point reached by the discharge of the tail race of the Norton Mills, for frequently they unmistakably consisted of mixtures of Upper Desplaines River water and water from the canal. Except in times of freshet or prolonged wet weather, the waters of this stream have but slight effect upon the sewage flowing past Joliet. The data of the analyses are given in the tables upon pages 110-115 inclusive; for reasons stated above, only the data for 1899 can be considered representative of the Desplaines River water before mixing with Chicago sewage.

4. THE SANITARY CANAL OR MAIN DRAINAGE CHANNEL AT LOCKPORT: After the opening of the main Drainage Channel, samples of water were collected from it just above the point of discharge into the Desplaines Valley, that is, just above the Bear Trap Dam or controlling works. The analyses for

*See discharge curves for 1900 in Plate XXXVII, and for 1901 in Plate XXXVIII.

1900 are given in detail upon pages 116 and 117, and for 1901 they appear upon pages 194 and 195. The variations which appear in the analytical data are due in the main to variations in the volume of flow in the Drainage Channel,* caused partly by differences in the lake level, partly by the partial closing of the gates at Lockport, and also at certain times by the overflow of water from the Desplaines River, at the spillway, into the Main Drainage Channel itself; further they are caused in part by variations in the pumping at Bridgeport, *for when the Bridgeport pumps are not in operation, a portion of the contents of the South Fork enters the South Branch and passes thence into the main Drainage Channel, while when the pumps at Bridgeport are kept in operation, practically all of the sewage from the South Fork is discharged into the old canal and enters the Desplaines River below the point of discharge from the Drainage Channel. The yearly averages are given in Table V below.

TABLE V.
CHICAGO MAIN DRAINAGE CHANNEL, LOCKPORT, YERALY AVERAGES, PARTS PER MILLION.

Year	Chlorine	Oxygen Consumed.			Nitrog'n as Ammonia				Organic Nitrogen			Nitrogen as	
		Total	By Dis-sov'd	By Sus-pen'd Matter	Free Ammonia	Albuminoid Ammonia Total	Albuminoid Ammonia Dis-solved	Albuminoid Ammonia Sus-pen'd	Total	Dis-solved	Sus-pended	Nitrites	Nitrates
1900	15.6	7.65	5.12	2.53	1.593	.421	.183	.238	.985	.442	.543	.006	.237
1901	14.5	9.29	6.76	2.53	1.715	.422	.238	.184	.99	.532	.458	.023	.183
Av'e	15.	8.47	5.94	2.53	1.654	.421	.210	.211	.987	.486	.5	.015	.21

5. THE DESPLAINES RIVER AT JOLIET.—At Joliet, which is four miles below Lockport, the Illinois and Michigan Canal crosses the Desplaines River by means of the pool or basin formed by dam number one, which is located in the upper part of the town, the Canal from this point on passing down beside the west bank of the river to its terminus at La Salle.

It is between this dam and Lockport that the discharges from the Illinois and Michigan Canal, and since January, 1900,

*See discharge curves, Plates XXXVII and XXXVIII.

the discharge from the Drainage Channel, enter the Desplaines Valley and mix with the waters of the Desplaines River, consequently this is the point at which the initial effect of the discharge of Chicago sewage is at the maximum.

Prior to the opening of the Drainage Channel the seasonal variations in the composition of the water at this point were considerable because of the variations in flow of the diluting waters of the Upper Desplaines. During much the greater part of the year, especially the summer and autumn seasons, the dilution of the concentrated sewage discharged from the old canal was very slight, but in the earlier or flood season of the year, the flow in the Desplaines at this point would occasionally amount to three or four hundred thousand cubic feet per minute, and the dilution of the sewage be correspondingly great, i. e. ten to one. In the summer season, when the natural flow in the Upper Desplaines generally dwindles to almost nothing, there was practically no dilution, the 36,000 cubic feet per minute of sewage discharged by the canal constituting the entire flow. Indeed, the river bed below the dam at Joliet would at times be almost dry, the flow for some distance below this point being entirely carried by the canal. Since the opening of the Drainage Channel, the volume* of water passing this point is much more uniform. The effect of the dilution* of the sewage is seen in the very great difference between the data of the analyses of samples taken before and those taken after the opening of the Drainage Channel.

Analyses of the waters of the river at this point were made in 1899 and 1900 for the Sanitary District. The details are not given in this report but the averages of the results for these two years are given in Table VI upon page 71.

During the year 1900 also there were often great variations in the proportions of the various constituents of the water. These variations were in part due to seasonal variations of flow in the Upper Desplaines and in part the result of variations in the flow in either the Illinois and Michigan

*The mean flows past Joliet for the years 1900-1901, and the relative quantities coming from the three different sources were as follows:

	Mean Flow cubic ft. per minute	Upper Desplaines	Illinois and Michigan Canal	Drainage Channel
1900	234,180	8 per cent.	11.5 per cent.	80.5 per cent.
1901	277.153	7.5 per cent.	5 per cent.	87.5 per cent.

Canal or the Drainage Channel or both, for when for any reason the flow in the Drainage Channel is reduced or stopped by manipulation of the gates at Lockport, sewage accumulates in the Chicago River and the discharge into the Desplaines consists chiefly of the more concentrated sewage of the old canal, and when the gates are again opened, a much less dilute mixture of the accumulated sewage is for a time discharged by the new canal. However, many of the variations hitherto noted were due to incomplete mixing of the several bodies of sewage and water which come together in this vicinity, a fact that is shown particularly by the results obtained from the two series of analyses made during 1901. During this year, a sample was taken at each side of the river at dam number one at Joliet. The averages for the year and also the mean for the two series are shown in Table VI below.

Comparison of the averages for 1900 and 1901 with those for 1899, makes evident the great difference in concentration of the sewage passing Joliet after the opening of the Sanitary Canal. Most of the sewage of Joliet enters the stream below the point at which the Joliet samples were collected.

TABLE VI.
CHEMICAL EXAMINATION OF THE WATER OF THE DESPLAINES RIVER AT JOLIET.
YEARLY AVERAGES. PARTS PER MILLION.

Year	Chlorine	Oxygen Consumed.			Nitrog'n as Ammonia				Organic Nitrogen			Nitrogen as	
						Albumoid Ammonia							
		Total	By Dissov'd	By Suspen'd Matter	Free Ammonia	Total	Dissolved	Suspended	Total	Dissolved	Suspended	Nitrites	Nitrates
1899	105.7	28.5	16.2	12.3	14.92	2.195	.831	1.364	4.502	1.732	2 77	.01	.208
1900	30.4	11.1	7.3	3.8	2.971	.707	.402	.305	1.574	.83	.744	.031	.31
East Side 1901	29.7	9.7	7.4	2.3	3.355	.478	.269	.209	1.05	.574	.476	.031	.334
West Side 1901	14.7	8.6	6.7	1.9	1.629	.359	.218	.141	.871	.515	.356	.03	.268
Mean	22.2	9.1	7.0	2.1	2.492	.418	.243	.175	.96	.544	.416	.03	.296

6. KANKAKEE RIVER AT WILMINGTON.—Until the Chicago Main Drainage Channel was opened, the sewage discharged through the Illinois and Michigan Canal met with its first notable dilution, usually, only upon mixing with the waters of the Kankakee, for although at times the flood flow in the Desplaines would, for a few days, equal, or even exceed, the mean flow in the Kankakee, i. e., would amount to from 300,000 to 400,000 cubic feet per minute, and dilute the sewage eight or ten times, yet the main flow of the Desplaines for the year is but one fifteenth to one tenth that of the latter stream, and the ordinary low water flow is proportionally even less.

The data of the analyses are given on pages 214 and 217 inclusive and upon page 225. The yearly averages are brought together in Table VII, page 73.

Inspection of the figures of the detailed analyses shows that there are notable variations in the composition of the waters of the Kankakee during the year. In general the variations are greatest in the spring of the year when freshets bring down much suspended matters, both mineral and organic; but it will be noticed that there is a considerable diminution in the proportions of nitrates during the warm summer months, this diminution doubtless being in part the result of the growth of vegetation in the flowing waters of the stream, in part the result of assimilation of nitrates by the vegetation of the headwaters in the Kankakee marshes, which during this portion of the year constitute the chief source of supply. The higher nitrates during the high water season are in part due also to the leaching of nitrates from the soil by the run-off and the discharges from tile drains, which occur chiefly during the seasons of lower temperature and greater precipitation, which are consequently of course the seasons of high water. The organic matters contained in the waters of this stream are almost entirely of vegetable origin, for no considerable amount of sewage is discharged into it, that of Kankakee (population 13,995), about 35 miles from the mouth and 25 miles above the point of collection, being the most important.

TABLE VII.
CHEMICAL EXAMINATION OF THE WATERS OF THE KANKAKEE RIVER AT WILMINGTON. YEARLY AVERAGES, PARTS PER MILLION.

Year	Chlorine	Oxygen Consumed.			Nitrog'n as Ammonia				Organic Nitrogen			Nitrogen as	
						Albuminoid Ammonia.							
		Total	By Dissov'd	By Suspen'd Matter	Free Ammonia	Total	Dissolved	Suspended	Total	Dissolved	Suspended	Nitrites	Nitrates
Jan.-Dec. 1896	2.4	13.8	....	....	.072	.491	....	....	1.1	....	....	.023	1.95
Jan.-May 1897	2.1	14.8	10.4	4.4	.03	.45	.352	.098	1.01	.85	.16	.0219	2.09
Jun-Dec. 1899	3.8	11.1	9.2	1.9	.075	.371	.265	.106	.886	.594	.292	.011	.972
Jan.-Dec. 1900	3.2	10.9	8.2	2.7	.059	.355	.247	.108	.863	.576	.287	.013	2.26
Av'e	2.88	12.65	9.3	3.	.059	.419	.288	.104	.965	.673	.249	.017	1.818

7. THE ILLINOIS RIVER AT MORRIS.—At this point, the first station upon the Illinois River proper, the stream consists of an incomplete mixture of the sewage-laden waters of the Desplaines with the waters of the Kankakee. Prior to the opening of the Drainage Channel, the Chicago sewage discharged into the Desplaines River experienced no considerable dilution before meeting the waters of the Kankakee, except when the Desplaines itself was in flood, which rarely was the case at times other than those of the usually short spring freshets.

When the Kankakee was in flood, the dilution at this point was of course correspondingly great (as much as fifty to one), the average dilution for the year being about ten to one, but ordinarily in the summer and autumn the dilution would probably rarely exceed two or three to one and often would fall far short of this. Since the opening of the Drainage Channel, the flow in the lower Desplaines is far more uniform, and the average is just about equal to the average flow of the Kankakee, which is 300,000 cubic feet per minute.

The details of the analyses appear. upon pages 118-122 inclusive and pages 124-125. The yearly averages are brought together in Table VIII below.

In considering the data of the analyses for Morris, it must be remembered that at this point the mixing of the waters is imperfect, and that the individual analyses consequently may appear to vary more than the mean composition of the incomplete mixture really warrants; but it is not likely that the variations thus occasioned are, for this point, sufficiently great to seriously affect the yearly averages and the comparisons instituted between them.

TABLE VIII.

CHEMICAL EXAMINATION OF THE WATERS OF THE ILLINOIS RIVER AT MORRIS. YEARLY AVERAGES, PARTS PER MILLION.

Year	Chlorine	Oxygen Consumed.			Nitrog'n as Ammonia				Organic Nitrogen			Nitrogen as	
						Albuminoid Ammonia							
		Total	By Dissov'd	By Suspen'd Matter	Free Ammonia	Total	Dissolved	Suspended	Total	Dissolved	Suspended	Nitrites	Nitrates
Jan.-Dec. 1896	29.7	14.5	....	....	3.55	.709	....	....	1.44	....	....	.149	1.72
Jan.-Dec. 1897	45.7	15.9	10.3	5.6	5.78	.862	.46	.402	1.608	.895	.713	.15	1.097
Jan.-Sept. 1998	34.7	17.3	....	....	4.109	1.398	....	....	2.491	....	....	.061	.896
May-Dec. 1899	65.6	14.7	12.1	2.6	8.9	.911	.59	.372	1.915	1.115	.8	.026	.553
4 yrs. Av'e.	44.4	15.6	11.2	4.1	5.585	.97	.499	.387	1.8625	1.05	.756	.0965	1.0665
1900	23 1	12.3	6.7	5.6	2.075	.535	.269	.266	1.162	.631	.531	.108	.717

8. THE ILLINOIS RIVER AT OTTAWA.—The collections at this point were made about a mile above the mouth of the Fox River and above the point where the sewage of the town and some discharge from the Illinois and Michigan Canal enter the stream.

The data of the analyses are shown upon pages 123, 127 and 136 and the averages are shown in Table IX.

The analyses show the changes which take place during the flow of 24 miles from Morris to Ottawa without further dilution and without notable addition of impurities, but the mixing of the discharges from the Desplaines and Kankakee is not yet complete and some variations of the analyses are due to this cause. It is to be noted that at this point the nitrites are found in the waters of the Illinois River in greater proportions than at any other point along its course, which fact, taken into consideration with the other indications of the analyses, shows that it is in this stretch of the river that the final oxidation processes which convert the organic matters of the sewage into innocuous mineral matters, the nitrates, etc., are most active and effective.

TABLE IX.

CHEMICAL EXAMINATIONS OF THE WATERS OF THE ILLINOIS RIVER AND OF THE FOX RIVER AT OTTAWA. YEARLY AVERAGES. PARTS PER MILLION.

Fox Year	Chlorine	Oxygen Consumed. Total	By Diss'vd	By Suspen'd Matter	Nitrog'n as Ammonia: Free Ammonia	Albuminoid Ammonia: Total	Dissolved	Suspen'd	Organic Nitrogen: Total	Dissolved	Suspended	Nitrogen as: Nitrites	Nitrates
Mar-Dec. 1898	7.93	9.3	7.1	2.2	.064	.407	.288	.119	.823	.553	.27	.027	.471
May-Dec. 1899	5.84	9.9	8.3	1.6	.055	.416	.27	.146	.94	.555	.385	.008	.373
Jan.-Oct. 1900	5.3	9.6	7.5	2.1	.129	.399	.251	.148	.815	.491	.324	.008	.416
Av'e.	6.36	9.6	7.63	1.96	.083	.407	.27	.137	.86	.533	.326	.014	.42
ILL. Jun-Dec. 1899	59.5	11.3	10.5	1.13	4.99	.498	.399	.099	1.111	.824	.287	.496	1.857
Jan.-Oct. 1900	21.3	8.6	6.9	1.7	1.311	.39	.244	.147	.848	.537	.311	.25	1.62
July-Oct. 1901	28.5	6.6	5.8	.8	.97	.223	.173	.05	.898	.508	.39	.454	1.209

9. THE FOX RIVER AT OTTAWA.—The Fox River is the largest tributary of the Upper Illinois proper, and next to that of the Kankakee River, its discharge is the most important diluting factor of the Upper Illinois. Its discharge is more uniform in volume than that of the Desplaines River and is greater in proportion to its watershed area.

The sample for analysis was collected above the town of Ottawa and above the aqueduct which carries the water of the Illinois and Michigan Canal across the stream. The waters of the Fox are rather highly charged with organic matters which are mainly derived from the vegetation which is abundant in the upper stretches of the stream, as well as in the marshes and shallow lakes which constitute the chief sources of its headwater supply.

The stream receives the sewage and manufacturing wastes of a number of towns, of which Elgin (population 22,433) and Aurora (population 24,147) are the largest. Between these two towns is the town of Geneva, where there is a large Glucose Works, in which 40,000 carloads of corn are used annually, the wastes from which, probably at least 150 tons of highly nitrogenous organic refuse daily, are discharged into the river.

Below Aurora comparatively little sewage and wastes enter the stream and there is considerable opportunity in the flow of 50 miles between Aurora and the mouth for the natural purifying processes to exert their influence in bettering the condition of the water.

The data of the analyses are shown in detail upon pages 218 to 224 and the averages are brought together in Table IX above.

10. THE ILLINOIS RIVER AT LASALLE.—The sample at LaSalle was taken beside the wagon bridge at a point which is three miles below the mouth of the Big Vermilion River, but above the point at which most of the sewage of LaSalle and the final discharge from the Illinois and Michigan Canal enters the river.

Between Ottawa and LaSalle, the conditions in the river are such as favor the abundant growth of vegetation and the waters at this point consequently become charged with organic matters to a greater extent than at Ottawa. The nitrates also are found at this point in greater proportion than they are found at Ottawa and have not been very notably reduced in proportion by the dilution resulting from the discharge through the Chicago Main Drainage Channel, a fact which is noted from comparison of the averages for the four years preceding and those for the year following the opening of the Drainage Channel. From Lockport to Ottawa the mixing of the waters seems to be at no point complete, and variations in the analyses due to this imperfect mixing are frequent, but study of the conditions at LaSalle, including analyses of cross-section samples, has shown that at this point the waters have ordinarily mingled completely.

Just below the town of LaSalle there occurs the final discharge from the Illinois and Michigan Canal, which carries most of the sewage of LaSalle, and the discharges of sewage and manufacturing wastes from the town of Peru.

It should be noted that at several points between Joliet and LaSalle there are minor discharges from the Illinois and Michigan Canal into the Desplaines River and the Illinois River, and that prior to the opening of the Drainage Channel, the old canal at times carried practically undiluted Chicago sewage throughout much of the 66 miles of its lower course. Indeed, in periods of low water the canal often carried the entire body of Chicago sewage past Joliet and discharged it at various points many miles below that at which it is now delivered into the river, thus carrying the pollution much farther down stream than the points at which it is now found.

Since the opening of the Drainage Channel, the diluted sewage which enters the stream between Lockport and Joliet is mainly carried by the Desplaines and Illinois rivers and the volume discharged from the canal at points below Joliet constitutes a much smaller proportion of the volume of the river; moreover, the water of the canal is now in far better condition because of its great initial dilution at Joliet and the more thoroughgoing natural purification thereby occasioned. The detailed analyses for LaSalle are given upon pages 128-130 and 132-135, and the yearly averages appear in Table X, page 78.

TABLE X.
CHEMICAL EXAMIATION OF THE WATER OF THE ILLINOIS RIVER AT LASALLE.
YEARLY AVERAGES. PARTS PER MILLION.

Year	Chlorine	Oxygen Consumed.			Nitrog'n as Ammonia				Organic Nitrogen			Nitrogen as	
						Albuminoid Ammonia.							
		Total	By Dissov'd	By Suspen'd Matter	Free Ammonia	Total	Dissolved	Suspended	Total	Dissolved	Suspended	Nitrites	Nitrates
Jan.-Dec. 1896	19.6	12.3	9.04	3.26	.971	.612	.429	.183	1.260	.98	.28	.255	2.51
Jan.-Dec. 1897	30.9	13.1	9.6	3.5	1.728	.6	.384	.216	1.234	.891	.343	.442	2.14
Jan.-Dec. 1898	25.9	11.2	8.4	2.8	1.396	.488	.357	.131	1.158	.721	.437	.25	.955
Feb.-Dec. 1899	44.7	13.6	10.4	3.2	2.536	.482	.379	.103	1.285	.807	.478	.385	1.955
4 yrs. Av'e	30.28	12.55	9.36	3.19	1.658	.5455	.387	.158	1.234	.852	.386	.333	1.89
1900	18.7	10.1	7.2	2.9	.963	.391	.251	.141	.944	.611	.333	.152	1.7

11. The Big Vermilion River is the most important tributary between Ottawa and Peoria. The discharge of this stream varies between rather wide limits, but is an important diluting factor only during the freshet season. In the drier season its flow is practically nothing but sewage, derived mainly from the towns of Pontiac and Streator and from the drainage of factories and mines upon its banks. The stream is used as a source of water supply for the towns of Pontiac and Streator and during much of the year the entire flow of the stream above these towns is used for water supply, and thus transformed into sewage is discharged again into the stream below the respective towns.

The samples for analysis were collected about half a mile within the mouth of the stream, the mouth being about three miles above the wagon bridge at LaSalle.

The analyses are not printed in detail in this report but the yearly averages are given in Table XI, page 79.

TABLE XI.
CHEMICAL EXAMINATION OF THE WATERS OF THE BIG VERMILION RIVER AT LASALLE. YEARLY AVERAGES. PARTS PER MILLION.

Year	Chlorine	Oxygen Consumed.			Nitrog'n as Ammonia				Organic Nitrogen			Nitrogen as	
		Total	By Dissov'd	By Suspen'd Matter	Free Ammonia	Albuminoid Ammonia. Total	Dissolved	Suspended	Total	Dissolved	Suspended	Nitrites	Nitrates
Jan.-Aug. 1896	11.9	4.9	......	......	.03	.245	...	...	.661	....	....	.035	4.65
May-Dec. 1899	64.9	6.4	4.9	1.5	.254	.244	.159	.085	.639	.406	.243	.022	.84
Jan.-Oct. 1900	16.4	7.3	4.8	2.5	.112	.259	.146	.113	.595	.314	.281	.018	3.52

12. THE ILLINOIS RIVER AT AVERYVILLE.—The samples were collected at midstream at the bridge over the narrows, three miles above the Peoria Court House and about 60 miles below LaSalle, at a point not affected by the sewage of Peoria.

Between LaSalle and Averyville there is no considerable additional dilution and no great amount of impurities introduced except that discharged from the Illinois and Michigan Canal just below LaSalle, which contains most of the sewage of LaSalle, and the sewage and manufacturing wastes of Peru, just below LaSalle.

The data of the analyses are shown in detail upon pages 137 to 143 inclusive and pages 200 and 201. The yearly averages are brought together below in Table XII.

The study of the data of the analyses and particularly comparison with those for the other points along the river between Averyville and Lockport show unmistakably that a very great purification of the waters of the stream takes place as they flow along the 125 miles of its course between these two points.

The seasonal variations in the water of the river at Averyville, as may be seen by study of the detailed analyses, are quite considerable, but the limits of variations are in most respects considerably less since the opening of the Chicago Drainage Channel than they were formely.

The variations of the chlorine are shown diagramatically upon Plate VII. It is quite natural under the existing circumstances that the proportions of chlorine should be smaller during the high water period, that is, in February, March and April, and that in the later season of the year, the warm summer months when the flow is very much reduced, the content of chlorine should be much greater than at other periods. Plates VIII and IX show graphically the seasonal variations in content of free ammonia. It is very noticeable that both before and since the opening of the Chicago Main Drainage Channel, the proportions of free ammonia are much greater in cold weather than at other seasons, and it is evident too that the proportions of free ammonia contained in the water are much less since the opening of the Chicago Drainage Channel than they were before that time.

Plate X shows the seasonal variations in the proportions of nitrites in the Illinois River water at Averyville. The curves of the plate show at a glance that the period when nitrites are most abundant in the Illinois River water at Averyville is in general the summer time or early autumn, when the flow is at the minimum and the temperature at the maximum, the conditions with respect to nitrites being just the opposite to those referred to above with respect to free ammonia. It is evident from the figures in the tables of analyses, and it is shown graphically upon the plate, that the proportions of nitrites since the opening of the Drainage Channel are in general less throughout the year than they were before the opening.

Comparison of the figures of Table XII below shows that as a result of the dilution effected by the opening of the Chicago Main Drainage Channel, the proportions of the various significant constituents of the water of the Illinois River at Averyville are very greatly reduced. The data throughout show this: the chlorine has been reduced from 30.2 parts, the average for the three years prior to the opening of the Drainage Channel, to 17.5 parts, the average for the two years subsequent to the opening; similar reductions in the quantities of oxygen consumed, both the total and that consumed by dissolved and by suspended matters, are evident; that the nitrogenous organic matters are very much reduced in proportions, is evidenced at once by comparison of the relative quantities of nitrogen as albuminoid ammonia, and the total organic nitrogen for the two periods; moreover, the proportions of nitrogen as free ammonia contained in the water since the opening is less than two-thirds that contained in the water at this point before the opening.

Comparison of the proportions of nitrites shows a very great decrease here since the opening of the Drainage Channel, the quantity being less than one-half that formerly contained. That the reduction of these constituents is not wholly due to mere dilution, but that, in part at least, it is due to a greater proportional destruction of the organic matters discharged into the stream at Lockport and Joliet, would seem to be evident from the fact that the nitrates are found in greater proportions in the water at this point than they were before the opening of the Drainage Channel.

TABLE XII.

CHEMICAL EXAMINATION OF THE WATERS OF THE ILLINOIS RIVER AT AVERYVILLE. YEARLY AVERAGES. PARTS PER MILLION.

Year	Chlorine	Oxygen Consumed.			Nitrog'n as Ammonia				Organic Nitrogen			Nitrogen as	
		Total	By Dissov'd	By Suspen'd Matter	Free Ammonia	Albuminoid Ammonia. Total	Dissolved	Suspended	Total	Dissolved	Suspended	Nitrites	Nitrates
Apr-Dec. 1897	37.9	11.3	9.4	1.9	.843	.503	.367	.136	1.01	.794	.216	.254	1.69
1898	21.4	9.3	7.5	1.8	.86	.403	.316	.087	.83	.646	.184	.124	.807
1899	47.2	12.9	9.4	3.5	1.025	.494	.325	.169	1.11	.722	.388	.204	1.558
3 yrs. Av'e.	30.2	11.1	8.76	2.4	.993	.466	.3?6	.13	.98	.72	.262	.194	1.351
1900	17.5	8.4	6.6	1.8	.639	.323	.226	.101	.767	.534	.233	.079	1.584
1901	17.5	7.7	6.7	1.	.647	.249	.198	.051	.717	.576	.141	.081	1.337
2 yrs. Av'e.	17.5	8.05	6.6	1.4	.643	.286	.212	.076	.742	.555	.187	.08	1.46

Comparison of the figures of Table XII for Averyville with those of Table X for LaSalle show that there has been a very great decrease in the organic matters during the flow of 60 miles between the two points. The diminution is very considerable in each case, even including the nitrates, but the most significance attaches to the marked diminution in the proportions of nitrites and free ammonia and albuminoid and total organic nitrogen.

The proportions of nitrites have been reduced about 50 per cent., which would appear to indicate that the nitrification processes are approaching completion, this in turn indicating that those organic substances which are easily susceptible to bacterial action have, in great part, already been consumed. In fact it is highly probable that the refuse animal matters introduced in the sewage of Chicago have been completely destroyed, and that the organic matters which are contained in the river water at this point are derived from vegetable and not from animal sources; in fact vegetation of various forms, the plankton, etc., is exceedingly abundant in the river between LaSalle and Averyville. The water of the river between these points and especially near Averyville may often be seen covered with floating masses of vegetation consisting largely of filamentous and other algae.

Comparison of the averages for Averyville with those for the tributary streams serves to show that the waters of the Illinois River at this point contain considerably less organic matters than is contained in the waters of its chief tributaries, which latter have never been in contact with Chicago sewage, although, of course, they receive some sewage from comparatively small towns. It is very evident, of course, that free ammonia and nitrites are still present in the waters of the Illinois at this point in greater quantities than are contained in most of the tributary streams, but the considerations detailed above and all available data show unmistakably that the character of the water in the stream at Averyville is now far better than it was before the Chicago sewage received its initial dilution at Chicago and not at the junction of the Desplaines and the Kankakee sixty miles nearer the point under consideration.

13. The Illinois River at Havana.—Collections at this point were made about a mile and a half above the town and above the mouths of the Spoon River and Quiver Lake. Between A veryville and Havana, sewage and manufacturing wastes are introduced into the river at Peoria and Pekin in quantities second only to those introduced through the Chicago Drainage Channel and the Illinois and Michigan Canal. These, however, consist very largely of refuse from stock yards, from the cattle sheds where some 40,000 cattle are fed upon distillery slops, and the wastes from large glucose works, etc., etc. Prior to the opening of the Chicago Drainage Channel, the condition of the river along this stretch of 45 miles was, during the summer time at least, practically that of an immense septic tank, the offensive condition of which was striking throughout, but was greatest in the near vicinity of Peoria and Pekin.

The data of the analyses are shown in detail upon pages 144 to 151 inclusive and the yearly averages are brought together in Table XIII below.

The data of the detailed analyses show seasonal variations similiar to those which were found at Averyville, and comparison of the yearly averages with those for Averyville show that, notwithstanding the introduction of an enormous amount of filth between Averyville and Havana, the putrefactive and other purifying processes going on in the waters of the stream have been sufficient to reduce the proportions of the various constituents so much that they were but slightly different at Havana from what they were at Averyville, although analyses of samples taken at Wesley, just below Peoria, and also at a point just below Pekin, show a notable increase in the content of organic matters at these two points, above the quantities found at Averyville and above those found at Havana, 30 miles below Pekin.

Comparison of the figures for the year 1900 with those of the years 1896 to 1899 inclusive (Table XIII) shows the effect of the opening of the Chicago Drainage Channel in reducing the proportions of the various constituents here considered. With the exception of the nitrates, the reduction of the various constituents is very considerable. The fact that the nitrates are not proportionally lowered seems to indicate that the oxidation at this point is more complete since the opening of the Sanitary Canal than it was previously.

Numerous determinations of dissolved oxygen in the waters of the Illinois at Havana, covering several years [1895-1898], show that, although at times the water is saturated, in general the content of dissolved oxygen is considerably less than that required for saturation, and at all times the dissolved oxygen diminished rapidly upon allowing the sample to stand.

TABLE XIII.

CHEMICAL EXAMINATION OF THE WATERS OF THE ILLINOIS RIVER AT HAVANA. YEARLY AVERAGES. PARTS PER MILLION.

Year	Chlorine	Oxygen Consumed			Nitrog'n as Ammonia				Organic Nitrogen.			Nitrogen as	
					Free Ammonia	Albuminoid Ammonia.							
		Total	By Dissov'd	By Suspen'd Matter		Total	Dissolved	Suspended	Total	Dissolved	Suspended	Nitrites	Nitrates
1896	15.1	10.9	...	......	.63	.49	....	....	1.17	..		.134	2.34
1897	24.8	10.8	9.6	1.2	.893	.46	.41	.05	.988	.717	.271	.203	1.66
1898	19.6	9.3	7.5	1.8	.95	.43	.32	.11	.92	.683	.237	.121	.809
1899	27.3	13.3	9.8	3.5	1.104	.56	.35	.21	1.303	.788	.515	.163	1.133
4 yrs. Av'e	21.7	11.1	8.97	2.16	.894	.485	.365	.12	1.095	.729	.341	.155	1.485
3 yrs. Av'e 97-99	23.9	11.1	8.97	2.16	.982	.484	.365	.12	1.071	.729	.341	.162	1.2
1900	14.8	8.7	6.8	1.9	.585	.361	.23	.131	.839	.533	.306	.07	1.308

14. SPOON RIVER AT HAVANA.—Collections were made about half a mile within the mouth of the river. The Spoon River drains a watershed area of about 1870 square miles, but, as there are no very considerable towns situated upon the stream or its watershed, it receives but little sewage and may be regarded as one of the least polluted of the natural streams of the state.

The data of the analyses are shown in detail upon pages 226 to 229 inclusive and the yearly averages are brought together in Table XIV below.

TABLE XIV.
CHEMICAL EXAMINATION OF THE WATERS OF THE SPOON RIVER AT HAVANA.
YEARLY AVERAGES. PARTS PER MILLION.

Year	Chlorine	Oxygen Consumed.			Nitrog'n as Ammonia				Organic Nitrogen			Nitrogen as	
		Total	By Dis-so'vd	By Sus-pen'd Mat-ter	Free Ammonia	Albuminoid Ammonia Total	Dis-sol-ved	Sus-pen'd	Total	Dis-sol-ved	Sus-pen-ded	Nitrites	Nitrates
1896	4.4	7.3	.....	.....	.119	.351	.....	....	.806	.....	.....	.04	1.63
1897	3.7	13.1	....	....	.148	.58	.....	.....	1.04	....	.....	.047	1.28
1898	3.4	14.8	.....	.....	.119	.603	....	...	1.47	.....	....	.039	.67
Av'e	3.8	11.8	....	.....	.129	.511	.....	.....	1.105	.....	.....	.041	1.19

15. THE ILLINOIS RIVER AT KAMPSVILLE.—At this point, thirty miles above the mouth of the Illinois River, the samples were collected just above the United States Government dam.

Samples have been collected here regularly each week from July 23rd, 1896, to the present time, and the results of the analyses, inasmuch as they cover three full years preceding and three full years-following the opening of the Chicago Main Drainage Channel, afford an excellent opportunity for judging the effects of the increased dilution of the sewage at Chicago and Joliet upon the character of the waters of the Illinois as they are about to flow into the Mississippi.

The series of analyses, which are shown in detail upon pages 152 to159 inclusive, and pages 202, 203, 238 and 239, make manifest the usual seasonal variations in the constituents of the water at this point. Some of the data are exhibited graphically by the Plates XI to XVI.

The data represented in Plates XI and XII show that in the usual high water period, that is the first half of the year, chlorine is contained in the water of the river at this point in just as considerable proportions as before the opening of the Drainage Channel, but that in the latter part of the year, which was formerly a period of extreme low water, the content of chlorine is now found to be considerably less than formerly.

Plate XIII exhibits the variations in the proportions of free ammonia and shows the great difference, in respect to the proportional content of free ammonia, between cold weather and warm weather conditions.

Plate XIV, which represents the seasonal variations in the proportions of nitrogen as nitrites. shows that these are not contained in the river at this point in so great quantity as they were previous to the opening of the Drainage Channel, but that they follow the same general course of seasonal changes as formerly, that is, they are least in cold weather, greatest in hot weather.

Plate XVI shows, by means of monthly averages, the proportions of total organic nitrogen and the seasonal variations which take place with respect to the content of nitrogenous organic matters.

The yearly averages are brought together in Table XV below.

TABLE XV.

CHEMICAL EXAMINATION OF THE WATERS OF THE ILLINOIS RIVER AT KAMPSVILLE. YEARLY AVERAGES. PARTS PER MILLION.

Year	Chlorine	Oxygen Consumed.			Nitrog'n as Ammonia				Organic Nitrogen			Nitrogen as	
		Total	By Dissov'd	By Suspen'd Matter	Free Ammonia	Albuminoid Ammonia			Total	Dissolved	Suspended	Nitrites	Nltrates
						Total	Dissolved	Suspended					
1897	19.3	10.9	7.7	3.2	.351	.509	.303	.206	1.024	.691	.333	.08	1.553
1898	12.6	11.7	6.8	4.9	.372	.484	.278	.206	1.018	.579	.439	.069	.764
1899	16.5	12.4	8.2	4.2	.392	.473	.257	.216	1.129	.623	.506	.052	.988
3 yrs. Av'e.	16.1	11.7	7.5	4.1	.371	.488	.279	.209	1.057	.631	.426	.069	1.101
1900	14.1	11.5	6.1	5.4	.382	.36	.206	.154	.904	.481	.423	.038	1.436
1901	15.6	9.4	7.2	2.2	.375	.338	.218	.12	.999	.579	.42	.044	1.221
1902	10.2	11.3	8.1	3.2	.424	.349	.23	.119		.....	....	.039	1.219
3 yrs. Av'e.	13.3	10.7	7.1	3.6	.393	.349	.218	.131	.951	.53	.421	.04	1.292

Comparison of the averages for the three years 1897-8-9 with each other shows no very great variations in the organic matters, though the oxygen consumed, the free ammonia and the total organic nitrogen increased somewhat from year to year, while the nitrites and nitrates decreased.

Comparison of the averages for 1900 with those for 1899 shows that immediately after the opening of the Drainage Channel there was a notable decrease in the proportions of the various constituents with the single exception of nitrates; the decided increase of which, taken into consideration with the 25 per cent. decrease in the proportions of nitrogen as albuminoid ammonia, indicates that under the new conditions the oxidation of the organic matters is more complete. The averages for 1901 correspond fairly well with those for 1900 except that the total organic nitrogen appears decidely higher, but this is doubtless due to the fact that the data for this constituent cover but the first nine months of the year, as press of other work made it necessary to discontinue the determination. The higher free ammonia in 1902 is chiefly due to the fact that in January and February, when the cold weather conditions are usually accompanied with high free ammonia in the Illinois River, the stage of water in the Illinois was remarkably low and the concentration correspondingly great.

Comparison of the averages for the two three-year periods makes evident the great diminution in the proportions of the various constituents, except free ammonia, which is .393 parts per million in the latter period as against .371 parts in the earlier period, and the nitrates, which have considerably increased.

Plate XV exhibits graphically by means of columns some of the facts shown in Table XV and facilitates the comparisions between the averages for the separate years.

THE ILLINOIS RIVER AT GRAFTON.—At this station samples were collected from the Illinois River at a point about two miles within the mouth, which is not reached by the water of the Mississippi River.

There are several islands in the Mississippi River close to the mouth of the Illinois lying parallel with and at no great distance from the Illinois shore. The United States engineers in charge of this section of improvement of the Mississippi River have had dikes built between these islands which prevent the waters of the Illinois River from discharging into the Mississippi River at the old mouth, but cause them to pass down for at least two miles parallel with the Mississippi River before finally entering the latter. In times of high water the discharge from the Illinois River flows over these dikes into the Mississippi River at points between one and two miles above Grafton, and also at times the waters of the Mississippi flow over them into the Illinois River. Our samples were collected above the point at which this occasional mixing occurs.

The data of the analyses are shown in detail upon pages 160 to 163 inclusive and pages 204, 205 and 240, and the yearly averages are brought together in Table XVI, page 89.

Comparison of the data of the analyses show seasonal variations of considerable magnitude in the waters of the Illinois River at Grafton, the most important of which, the albuminoid ammonia and the total organic nitrogen, are shown in Plates XXI and XXII. Comparison of the yearly averages shows a considerable improvement in the character of the Illinois River water at this point since the opening of the Chicago Main Drainage Channel.

17. THE MISSISSIPPI RIVER AT GRAFTON.—samples were taken at midstream at a point about two miles above Grafton and above that at which any discharge from the Illinois River enters the stream. The analyses, which are given upon pages 164 to 167, 206 and 207, show that seasonal variations in the constituents of the waters of the Mississippi River are in many respects more frequent and more considerable than the seasonal variations in the waters of the Illinois. This is especially true of the albuminoid ammonia and the total organic nitrogen, as is evident upon consideration of the features of Plates XXIII and XXIV, which represent the proportions of these constituents in the Mississippi for 1899 and 1900 respectively, and comparison with Plates XXI and XXII, which shows the variations of the proportions of the same constituents in the waters of the Illinois for the same years.

The yearly averages are given in Table XVI below.

Plate XXV shows a comparison of the proportions of chlorine in the waters of the Mississippi and the Illinois for the years 1899 and 1900.

COMPARISON OF THE WATERS OF THE ILLINOIS AND THE MISSISSIPPI.

Comparison of those data of Table XVI below which represent the averages for the Mississippi River water just above the mouth of the Illinois for the years 1899-1902, shows somewhat notable variations from year to year, but comparison of the averages for the Mississippi with those for the Illinois shows that organic matters, as represented by the oxygen consumed, were in each of the four years contained in the waters of the Mississippi in considerably greater propor-

TABLE XVI.

CHEMICAL EXAMINATIONS OF THE WATERS OF THE ILLINOIS RIVER AND THE MISSISSIPPI RIVER AT GRAFTON, BEFORE AND AFTER THE OPENING OF THE CHICAGO MAIN DRAINAGE CHANNEL.

YEARLY AVERAGES. PARTS PER MILLION.

Year	Chlorine	Oxygen Consumed			Nitrog'n as Ammonia				Organic Nitrogen			Nitrogen as	
		Total	By Dissov'd	By Suspend Matter	Free Ammonia	Albuminoid Ammonia. Total	Albuminoid Ammonia. Dissolved	Albuminoid Ammonia. Suspended	Total	Dissolved	Suspended	Nitrites	Nitrates
Ill. 1899	14.73	12.6	8.3	4.3	.313	.479	.247	.232	1.148	.596	.552	.045	1.063
1900	13.13	10.2	6.7	3.5	.343	.375	.191	.184	.885	.472	.413	.025	1.364
1901	15.3	11.3	7.5	3.8	.245	.413	.241	.172	1.029	.553	.476	.033	1.273
1902	9.35	10.6	8.	2.6	.379	.362	.229	.093	....	....		.032	1.074
3 yrs. Av'e	12.6	10.7	7.4	3.3	.322	.37	.22	.149	.957	.512	.444	.03	1.237
Miss. 1899	2 8	15.2	9.8	5.4	.077	.508	.217	.291	1.168	.485	.683	.012	.34
1900	3.1	16.4	10.6	5.8	.113	.448	.222	.226	1.03	.476	.555	.007	.471
1901	2.8	14.1	10.6	3.5	.182	.403	.202	.201	.969	.431	.538	.006	.314
1902	3.	14.7	9.3	4.5	.095	.464	.189	.275		....	.....	.01	.496
4 yrs. Av'e	2.92	15.1	10.0	4.8	.116	.455	.207	.248	1.055	.464	.592	.009	.405

tions than in the waters of the Illinois in 1899, and were nearly fifty per cent. greater than the average for the three years after the opening of the Chicago Main Drainage Channel.

The proportions of nitrogenous organic matters as represented by albuminoid ammonia and total organic nitrogen, as is seen upon comparison of the general averages, were notably higher in the Mississippi than in the Illinois, although in the year 1901 they were slightly higher in the latter stream.

On the other hand the oxidation products of nitrogenous organic matters, represented by the free ammonia, the nitrites and the nitrates, were present in the waters of the Illinois in proportions which are two to three times those contained in the waters of the Mississippi, and the total nitrogen, that is, the sum of the total organic nitrogen, the nitrogen as free ammonia and that as nitrites and nitrates, was 2.546 parts per million in the Illinois against 1.585 in the Mississippi.

The preponderance of nitrogen in the waters of the Illinois over the proportions contained in the waters of the Mississippi is doubtless due to the fact that the watershed of the former is more extensively and more intensively cultivated than is that of the latter and that the industrial wastes which are discharged into the Illinois are more highly nitrogenous in character than are those which find their way into the Mississippi. For example, the refuse matters discharged into the Illinois River at Peoria and Pekin consist largely of the highly nitrogenous wastes from glucose factories and those resulting from the feeding of cattle upon distillery slops, while the organic matters contained in the waters of the upper Mississippi are derived largely from the wastes of the lumber industries. Both streams of course receive in the aggregate enormous quantities of sewage.

DISSOLVED OXYGEN.—Determinations of dissolved oxygen in the waters of the Illinois and the Mississippi rivers at Grafton show that in general the waters of the Illinois contain practically the same proportions of oxygen in solution as do those of the Mississippi, although the stability of the organic matters, as measured by the partial disappearance of the dissolved oxygen when the samples are allowed to stand in the dark for 24 hours, is somewhat greater for the Mississippi than for the Illinois.

The data of the analyses are not printed in this report, but those obtained from shipped samples (24 hours between collection and examination) are represented in the curves of Plate XL.

From January 4th, 1900, to June 27th, the percentage of saturation in shipped samples of the waters of the Illinois ranged from 43 to 95.7, the minimum being found in samples collected May 16th and examined 48 hours later; in no other ease was less than 52.7 per cent. found and indeed in but five other samples was less than 61 per cent. found. The average for the 141 samples was 76.5 per cent.

A parallel series of samples from the Mississippi gave 55.8 per cent. for the minimum and 108.8 per cent. for the maximum, with 82 per cent. as the average for the 127 samples. Similar variations and similar relations between the two rivers are shown in Plate XL for the latter part of 1901.

Numerous determinations made upon the spot show that the waters of both the Illinois and the Mississippi are frequently supersaturated with dissolved oxygen, and also that often both contain less than the saturation quantity, the range being greater in the Illinois, but the average being practically the same for both.

18. THE MISSISSIPPI RIVER AT ALTON.—For several years, samples of water were collected at the intake of the old Alton City Water Works and also a few samples were collected at mid-stream, but in the fall of 1898 arrangements were made for the collection of series of samples at a point opposite the new water works, nearly a mile above the town.

At this place five samples were collected, at as many different points across the stream, for the purpose of determining the differences in composition due to the incomplete mingling of the waters of the Illinois River with those of the Mississippi. The point where these samples were taken is 16 to 17 miles below the mouth of the Illinois river at Grafton and 6 or 7 miles above the mouth of the Missouri River, or 15 to 16 miles above the intake of the St. Louis Water Works at Chain of Rocks.

The data of the analyses are given upon pages 168 to 191 inclusive and some of them are represented graphically by means of the Plates XXVI to XXIX.

Consideration of the data shows how incomplete is the mixing of the waters of the Illinois with the waters of the Mississippi, the facts being brought out especially by comparison of the proportions of chlorine contained in the waters of the Illinois River and the Mississippi River above Grafton with those found at different points in the cross section of the stream at Alton.

Plate XXVI gives comparative curves representing the results of chlorine determinations in the regular weekly samples for the years 1899 and 1900. Several times, in January and February,when, because of stationary ice, it was impracticable to reach the proper points, the collections were made at the ferry crossing opposite the town nearly a mile below; and also at times during the same months, because of difficulties resulting from the quantities of floating ice, the samples were not collected at really representative cross section points so that the data for parts of these two months, for both years, show proportions of chlorine which are not truly representative for the Missouri side of the stream, because the collector who started from the Illinois side could not get far enough out toward the Missouri shore. Plates XXVII and XXVIII represent the same data for 1899 and 1900 respectively, but in the form of monthly averages.

Plate LI represents the proportions of Illinois River water and Mississippi River water which constitute the mixture at the different points across the stream. The calculations are based upon the average content of chlorine for the year. They show that very little of the water of the Illinois (4 per cent. Illinois water and 96 per cent. upper Mississippi water) is contained in the mixture toward the Missouri shore but that far the greater part of it passes down between mid-stream and the Illinois shore.

The seasonal variations of free ammonia and also the cross-section variations are shown in Plate XXIX. It is to be noted that during much of the year there is little difference between the proportions of free ammonia found at the different points, as also between the proportions found in the Illinois and those in the Mississippi, and that at times more free ammonia is found in the waters of the Mississippi than in the waters of the Illinois.

19. THE MISSISSIPPI RIVER AT QUINCY.—Samples of water were collected from the Mississippi River at Quincy at a point near the end of the intake conduit of the Quincy Water Works, which is at a point above that at which any discharge of sewage from Quincy enters the river.

The data of the analyses are given on pages 208 to 214 inclusive and are partially shown in the diagrams on Plates XXXII and XXXIII. A study of the data of the tables shows that the seasonal variations in the proportions of the different constituents of the water of the Upper Mississippi River are quite as frequent and fully as considerable as are the variations in the composition of the water of the Illinois River.

Comparison of the data for the Mississippi at Quincy with those for the same stream at Grafton show substantial similarity of the water at these two points—more than 100 miles apart—both as to the proportions of the different constituents and the variations of the same.

COMPARISON OF THE WATER AT VARIOUS POINTS ALONG THE ILLINOIS RIVER.—Upon plate VI there are shown the seasonal variations in the proportions of chlorine in the waters of the Illinois River at several different points for the years 1896 to 1900 inclusive. Upon inspection of these curves, which are representations of all the analyses made in the respective years for the points considered, the great differences in the content of chlorine between the first half and second half of the year is manifest, these of course being due to the greater volume of water flowing during the first half of the year and the consequent dilution of the sewage, while in the second half of the year the dilution was small and the proportion of chlorine naturally much greater.

Comparison of the lines for the year 1900 with those for the preceding years shows that after the opening of the Chicago Drainage Channel the proportions of chlorine were much more uniform throughout the year, the reason, of course, being, that the dilution in the latter half of the year more nearly corresponded to what was formerly the natural dilution in the earlier part of the year.

Upon Plate V there are shown lines which represent the proportions of various constituents contained in the waters of the Illinois River at several different points from Lockport to Grafton inclusive. For a number of these points the lines represent the averages for four years analyses preceding the opening of the Chicago Drainage Channel.

For some of the others, the analyses do not cover so long a period, but in every case they cover two years or more. There are also shown in a number of cases the average proportions of the constituents at these same points during the year 1900, that is, the year just after the opening of the Drainage Channel.

CHLORINE.—The proportion of chlorine in the canal water at Lockport is seen from the plate to be a little more than 120 parts per million. The considerable drop between Lockport and the next point, which is Morris, is due, in small part of course, to dilution with the waters of the Desplaines River but is mainly due to dilution with the waters of the Kankakee.

Between Morris and LaSalle the next point, there come in the discharges from several minor tributaries, but the most important diluting factor between these points is the Fox River. From LaSalle to Averyville there is practically no change in the content of chlorine, for although between these points various smaller tributaries discharge into the river, the stream also receives some sewage and waste waters which are quite highly charged with chlorides and which consequently, notwithstanding the increase in volume which occurs, keep up the proportion of chlorine.

Between Averyville and Havana there is a notable diminution in the content of chlorine and from there on to Kampsville and down to the mouth at Grafton a somewhat continuous decrease is apparent, the proportions at Grafton being 15 parts per million.

The curve for 1900 begins at about the same point but is intended to show the content of chlorine in the mixture at Joliet since it is at this point that the different discharges of Chicago sewage come together. The proportion is but one-fourth that of the canal at Lockport for the earlier period, the difference representing approximately the effect of the dilution produced by the use of the Drainage Channel. From this point down there is a notable diminution in the proportions of chlorine contained in the water, which in a measure keeps step with the diminution which formerly occurred, but is less considerable from point to point, and finally at the point of discharge into the Mississippi the proportion of chlorine is slightly more than 13 parts per million, which shows the effect of the dilution by the use of the Drainage Channel as it affected the discharge from the Illinois into the Mississippi during the year 1900.

OXYGEN CONSUMED.—The lines representing the oxygen consumed, both the total and that by the filtered water, show marked diminutions between Lockport and Morris and considerable and somewhat continuous diminution from Morris to Havana, beyond which point the total oxygen consumed increases slightly so that the proportions required by the water discharged at Grafton are greater than they were at either Averyville or Havana, this being in part due to the luxuriant growth of vegetation in the lower stretches of the river and in part due to other suspended matters, silt, etc., which during a portion of the year are more abundant in the lower stretches of the river than they are farther up.

NITRITES.—Comparisons of the proportions of nitrogen as nitrites shows that before the opening of the Drainage Channel there were but extremely small proportions contained in the water at Lockport, but notably greater proportions at Morris, the maximum shown being at LaSalle, which argues for the greater activity of the oxidizing processes near this point than at points far above or below LaSalle, for while the proportions of nitrites below this point are always considerable, there is a continuous diminution all the way down to the mouth of the river at Grafton.

The curve for 1900 shows similar relations between the different points but a very notably smaller proportion of the nitrites at points below Morris. It is evident from the curves however, that the zone in which the greatest activity of the nitrifying processes is reached, has not been changed in position by the opening of the Drainage Channel, that is, it appears unmistakably from the data of our analyses and is shown clearly in these curves that the point where the oxidation is most active and thoroughgoing is still between Morris and LaSalle. The data of Table IX, Page 75, appear to show that the point is approximately mid-way between these two, that is, somewhere near Ottawa.

NITRATES.—The lines representing the nitrates show a remarkable increase in the proportions contained as we proceed from Lockport and Joliet to Morris and so on to LaSalle. The increase of nitrates between Joliet and Morris is due, of course, in part to the fact that the waters of the Kankakee River which unite with those of the Desplaines between these two points are in certain seasons very highly charged with nitrates, but much of it undoubtedly is due to the activity of the nitrifying organisms, which in this stretch of the river appear to find the conditions of food supply and dilution most propitious. The greater increase of nitrates between Morris and LaSalle must be regarded as practically entirely due to the nitrifying processes which in this stretch of the river complete the destruction, that is, the oxidation, of the organic matters discharged into the river in the Chicago sewage at Lockport and Joliet.

From LaSalle to Averyville there occurs a very considererable decrease in the nitrates. This is due not to dilution, for no considerable dilution occurs between these points, but to the utilization of nitrates by the vegetation which is extremely abundant in the broad lake-like stretches of the river between these points. From Averyville down to the mouth of the river there is considerable diminution in the proportions of the nitrates and this also is due to the cause referred to above, namely, the luxuriant vegetation, both that of the river banks and bed and the floating forms.

The curve for 1900 shows similar sets of conditions althrough the proportion of nitrates is not so great at Morris as it was formerly, a fact which is doubtless due to the greater dilution. At LaSalle, the proportion more nearly approximates those formerly contained, and below this point, although there takes place a notable diminution in the quantity of nitrates on the way to Averyville and Havana, beyond Havana they again increase. Below LaSalle there is no point along the river at which the nitrates are not now present in considerably greater proportions than were found in the river water before the opening of the Drainage Channel. With respect to these differences in the proportions of nitrates between the two periods in question, it seems evident that the conclusion to be drawn must be that, nitrification now takes place at least as completely, and it would seem far more completely, than before the opening of the Drainage Channel. The fact that the proportions of nitrates are less at Havana than at Kampsville and Grafton, would seem to be due to the fact that the great masses of filth which are discharged into the stream in the vicinity of Peoria and Pekin, owe their destruction in part to the utilization of oxygen from nitrates which are brought down in abundance by the waters passing Averyville.

FREE AMMONIA. The line representing nitrogen as free ammonia for the period prior to the opening of the Drainage Channel shows excessive proportions of this constituent at Lockport, the diminution on the way to Morris being chiefly due to dilution, but that between Morris and LaSalle being mainly due to its oxidation to nitrites and nitrates, to its assimilation by the vegetation of the river and in part undoubtedly to its elimination as free nitrogen gas.

Between LaSalle and lower points upon the river the diminution proceeds continuously, although free ammonia is contained in notable quantity in the water finally discharged into the Mississippi at Grafton.

The line for 1900 shows a much lower content of ammonia at the point of initial discharge of Chicago sewage, but it also shows considerable diminution on the way down the river, although, as is apparent from the plate and also from Table XV, page 86, and Table XVI, page 89, the proportions contained in the water as it passes Kampsville and is discharged at Grafton were slightly greater in 1900 than the average for the preceding years.

ALBUMINOID AMMONIA.—The line representing the nitrogen as albuminoid ammonia constitutes for the upper part of the river a curve quite similar to that just discussed for the free ammonia, but below Averyville there is a slight increase on the way to Havana, due to the discharge of refuse at Peoria and Pekin; below this point the quantity does not further diminish but on the other hand very slightly increases. Comparison of the line for the total albuminoid ammonia with that for the albuminoid ammonia derived from substances in solution, shows that while the latter diminishes markedly between Havana and Grafton, the total very slightly increases.

TOTAL ORGANIC NITROGEN.—The line representing the total organic nitrogen shows much the same features as those just referred to, although the proportions of total organic nitrogen are somewhat more than twice as much as those of the albuminoid ammonia.

Comparison of the curves for the period 1897 to 1899 with the curve for 1900 shows how great an effect the dilution produced by the opening of the Drainage Channel has had, and shows that this effect extends to the mouth of the Illinois River. The fact that the total organic nitrogen and the nitrogen as albuminoid ammonia do not decrease below Havana, is undoubtedly due to the presence of the enormous masses of vegetation in the waters of the lower river. That the free ammonia does not decrease below the proportions shown for Grafton, is doubtless due to its continuous production through the decomposition of the various organisms constituting the plankton, which from time to time complete their life cycles, and the remains of which then enter upon the universal series of transformations to which all such organic matters are subject.

COMPARISON OF THE ILLINOIS WITH ITS TRIBUTARIES.

Comparison of the detailed data of the analyses of the water of the Illinois at Averyville and at Grafton with the data of the analyses of the waters of the tributary streams, shows that the latter are subject to seasonal variations which in most respects are quite as great as are those of the Illinois.

Comparison of the yearly averages, see Table XXII below, shows that the proportions of organic matters as represented by oxygen consumed, albuminoid ammonia and total organic nitrogen, are even more considerable in the waters of the larger tributaries than in the waters of the Illinois at Grafton, and the general averages for the six tributaries examined are substantially equal to the averages for the Illinois for 1900-1-2. Free ammonia and nitrites, however, are in general more abundant in the waters of the Illinois than in the tributary streams, although three of the latter carry as much or more nitrites than the Illinois.

Comparisons for the four summer months, for 1899 and for 1900, are shown graphically in Plate XLII.

TABLE XVII.

COMPARISON OF THE WATERS OF THE ILLINOIS WITH THE WATERS OF ITS TRIBUTARIES.
AVERAGES. PARTS PER MILLION.

Stream.	Chlorine	Oxygen Consumed.			Nitrog'n as Ammonia				Organic Nitrogen			Nitrogen as	
		Total	By Dissov'd	By Suspen'd Matter	Free Ammonia	Albuminoid Ammonia. Total	Albuminoid Ammonia. Dissolved	Albuminoid Ammonia. Suspended	Total	Dissolved	Suspended	Nitrites	Nitrates
Des P.[1] 1899	7.7	12.9	11.4	1.4	.129	.481	.379	.102	.997	.782	.262	.01	.36
Kkk.[2] 1896 1900	2.88	12.6	9.3	3.3	.059	.419	.288	.104	.965	.673	.249	.017	1.82
Fox 1898-1900	6.36	9.6	7.6	2.	.083	.407	.27	.137	.86	.533	.327	.014	.42
Big V.[3] '96-99-1900	31.	6.2	4.9	2.	.165	.249	.155	.094	.632	.36	.272	.025	3.
Spoon 1896-7-8	3.8	11.8	....	.....	.129	.511	....	....	1.105	....	....	.041	1.19
Sangamon 1899-1900	5 3	8.6	4.9	3.7	.111	.295	.15	.145	.751	.354	.397	.032	1.23
Average	....	10.3	7.6	2.5	.113	.36	.248	.115	.885	.54	.302	.023	1.366
Ill. G.[4] 1900-2	12.6	10.7	7.4	3.3	.322	.37	.23	.149	.957	.512	.444	.03	1.237
Ill. G.[4] 1899	14.73	12.6	8.3	4.3	.313	.479	.247	.232	1.148	.596	.552	.045	1.063
Ill. A.[5] 1900-01	17.5	8.5	6.6	1.4	.643	.286	.212	.076	.727	.555	.187	.08	1.46
Ill. A.[5] 1897-8-9	30.2	11.1	8.76	2.4	.909	.466	.336	.13	.98	.72	.262	.194	1.351

1. Desplaines. 2. Kankakee. 3. Big Vermilion. 4. Illinois at Grafton, 5. Illinois at Averyville.

SUMMARY OF GENERAL CONCLUSIONS.

FIRST. Notwithstanding the discharge of the greater part of Chicago's sewage into the Desplaines River and thence into the upper Illinois, and the enormous influx of sewage and other refuse at Peoria and Pekin, the waters discharged by the Illinois River into the Mississippi River were, prior to the opening of the Chicago Main Drainage Channel, in many respects superior to the waters of the Mississippi itself, and certainly no more impure than were the waters of its own larger tributaries.

SECOND. Since the opening of the Chicago Main Drainage Channel or Sanitary Canal, although the quantities of organic matters in the sewage now discharged into the Desplaines and Illinois Rivers are 30 per cent. greater than before, the proportions of organic matters contained in the waters discharged by the Illinois River into the Mississippi are very considerably smaller than they were prior to 1900; and that this decrease of the proportions is not a mere dilution, is shown by the fact that the actual quantities of organic maters discharged are now less than they were formerly.*

THIRD. The waters of the Illinois River at Grafton are practically as well aerated, or rather are as well charged with dissolved oxygen as are the waters of the Mississippi.

FOURTH. The waters of the Illinois do not mix thoroughly with the waters of the Mississippi River, but mainly pass down near the east bank of the river.

See Appendix page vii.

APPENDIX.

THE QUANTITIES OF NITROGEN IN THE WATERS OF THE ILLINOIS RIVER.—The investigation of the waters of the Illinois River has shown unmistakably that the opening of the Chicago Main Drainage Channel has brought about a substantial reduction of the proportions of organic matters therein contained, but the question as to whether this is effected simply as dilution, or in part through more complete oxidation, calls for consideration of the actual quantities of the organic matters contained in these waters.

As measurements of the flows of the Illinois and Michigan Canal, the Main Drainage Channel, the Desplaines River at Riverside, and the Desplaines at Joliet are available for the years 1900 and 1901,* it is possible to calculate the quantities of organic matters contained in the waters of these various streams. For Averyville too, discharge measurements made at Peoria on the behalf of the State Board of Health,† render it possible, from consideration of the actual flow of water and the proportional content of the various constituents, to calculate the quantities of organic substances contained in the water of the Illinois River at this point.

The point to which we have given most attention, however, is Kampsville, thirty miles above the mouth. Mr. A. V. Brainerd, Assistant U. S. Engineer, who is in charge of

*These data, for the use of which I am indebted to the Honorable Arthur R. Reynolds, M. D., Commissioner of Health for Chicago and Director of Streams Examination for the Sanitary District of Chicago, are not given here in detail but are represented in the curves of Plates XXXVII and XXXVIII.

†Illinois State Board of Health Report of Sanitary Investigations of the waters of Illinois River, 1901, Page 179.

the U. S. government work upon the Illinois River, has kindly furnished us such information concerning the dam and the stream at Kampsville, as enables us to calculate the flow for each day throughout the six years of the period we are considering. The height of water upon the river gauge at this point is read three times daily and the means are published in the various reports of the Engineer Corps of the United States Army; some of the more recent unpublished data have been furnished to us directly by Mr. A. V. Brainerd.

From these data* the flows per 24 hours have been calculated and the monthly and yearly averages have been computed. The flows for each 24 hours have been calculated by use of the weir formula, with correction for the submergence which occurs generally in the spring, but occasionally in other seasons, and which some times reaches the depth of ten feet or more. At times when the dam is very deeply submerged, there is also considerable flow over the banks and through the bottoms around the dam, so that for the short periods of extremely high water, the flows thus calculated are undoubtedly much below the truth. Occasionally the dam is submerged by the backing up† caused by high water in the Mississippi, though the flow in the Illinois itself at the time may be small. On the other hand, flows calculated directly, without allowance for submergence of the weir, are in all probability considerably too high; but the true flow for such periods lies somewhere between these limits. It is, of course, to be noted that the conditions which occasion these uncertainties exist in general only during a few weeks in the flood season, that is, in the spring of the year, and that for most of the year the calculations by the method above given are correct to within about 10 per cent.

The figures representing the heights of the river gauge and the flows are not shown in detail in this report, except as the latter appear in the form of curves upon plates XIX and XX.

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*For supervision of these calculations I am indebted to Professor A. N. Talbot, head of the department of Municipal and Sanitary Engineering in the University.

†Indeed even a current up stream, i. e., a flow up from the Mississippi to a point 10 miles above Kampsville or 40 miles above the mouth has been observed.

Upon plate XIX, only the corrected flows for submerged weir are shown, while upon plate XX there are shown also the maximum flows for flood periods calculated directly, without allowance for the submergence.

The calculations of the actual quantities of nitrogen in the organic matters contained in the water at Kampsville have been made in several different ways: those which appear in plate XVII representing the total organic nitrogen have been calculated on the basis of the discharge of water (corrected for submergence of weir) for the day upon which the sample for analysis was collected.

The lines of this plate show how considerable were the seasonal variations in the weights of organic nitrogen discharged over the dam at this point during the years 1896-1900 inclusive.

Com parison of these curves with each other shows that during the year 1900, that is, the first year after the opening of the Chicago Main Drainage Channel, the weights of organic nitrogen carried by the water of the Illinois were generally less than they were during the preceding years, during both the high and the low water seasons, except that in 1899, during the period ranging from the middle of August to the middle of November, when the flow in the river was extremely low, the quantities of organic nitrogen were less than in 1900.

Calculations based upon monthly averages, both for the data of the analyses and for the flow of the river, show similar, but of course less irregular variations, throughout the year.

The data represented by the lines of Plate XXXVI show that the quantities of organic nitrogen contained in the water of the Illinois at Kampsville, were in the high water season not less than six and possibly as much as twelve times as great as the quantities contained in the water of the Desplaines at Joliet, which comprises that of the Upper Desplaines, the Chicago Main Drainage Channel or Sanitary Canal, and the Illinois and Michigan Canal. The lower figures for Kampsville, which are calculated for submerged weir, are shown in the plate by the series of small circles, the higher by the solid line. The differences between the lines for Averyville and Kampsville indicate the quantities of organic matters brought into the lower Illinois by tributaries and the sewage of Peoria, Pekin, etc., which escape oxidation.

Plate XXXV represents similar data for the albuminoid ammonia.

Plate XXXIV shows that the quantities of nitrogen as free ammonia, contained in the water of the river at Kampsville, are very much greater during the high water period, that is, January, February and March than at any other time during the year and are several times greater than the quantities discharged with Chicago sewage into the Desplaines at Joliet and Lockport, but that later in the year, from May to November, the conditions are just reversed, the quantities contained in the stream at Kampsville and also at Averyville being very much less than the quantities found in the Sanitary Canal or in the water of the Desplaines at Joliet.

The very large quantities of free ammonia in January and February are coincident with comparatively low water (See Plate XX) and with the excessively high proportion of free ammonia (See Plate XIII) which is characteristic of the Illinois for the extreme cold weather season. The much greater quantities of free ammonia in March are derived in large part from the rain and the surface wash.

In Plate XXXIV there are also shown lines representing the quantities of nitrogen in the form of nitrates. The enormous quantities of nitrates found in the water at Averyville and Kampsville during March and April, the freshet season, are in the main derived from the leaching of surface soils by the run off and the discharges of tile drains.

The decrease at the coming of warmer weather and lower water, in May and June, results from the partial cessation of the leaching, from the partial exhaustion of the supply of nitrates in the soil, and from the assimilation of nitrates by the vegetation, especially that of the plankton which at this season of the year increases in abundance with very great rapidity.

It has not been practicable for us to give here the numerical data in detail but some of the data for yearly averages appear in the three following tables.

TABLE XVIII.

QUANTITIES OF NITROGEN IN THE WATERS OF THE ILLINOIS RIVER AT KAMPSVILLE. TONS DISCHARGED PER 24 HOURS. YEARLY AVERAGES CALCULATED FROM THE DISCHARGES (IN TONS) FOR EACH MONTH.

	Nitrogen as					
Year	Nitrites	Nitrates	Free Ammonia	Kjeldahl Organic	Total Nitrogen	Albuminoid Ammonia
1897	2.9	84.61	9.04	48.41	144.96	22.7
1898	2.59	38.71	13.1	48.95	103.35	22.9
1899	1.2	27.45	10.2	38.29	77.14	14.64
Average	2.24	50.2	10.78	43.88	107.1	20.08
1900	1.1	50.96	14.2	38.29	104.55	14.88
1901	.767	34.26	9.6	27.	71.627	10.23
1902	1.98	50.31	9.6	42.9	104.79	17.1
Average	1.28	45.1	11.1	36.06	93.54	14.07

TABLE XIX.

QUANTITIES OF NITROGEN IN THE WATERS OF THE ILLINOIS RIVER AT KAMPSVILLE. TONS DISCHARGED PER 24 HOURS; CALCULATED FROM YEARLY AVERAGES OF FLOWS AND YEARLY AVERAGES OF CONSTITUENTS.
(See Table XV, page 86.)

Nitrogen as							
Year	Nitrites	Nitrates	Free Ammonia	Kjeldahl Organic	Total Nitrogen	Albuminoid Ammonia	Oxygen consumed
1897	3.86	65.83	15.4	47.8	132.89	21.94	478.4
1898	2.97	32.71	16.01	43.91	95.6	20.79	603.7
1899	1.33	25.12	10.05	28.94	65.44	12.12	317.9
Average	2.7	41.22	13.82	40.22	97.93	18.28	433.3
1900	1.33	50.51	13.22	31.87	96.93	12.62	327.2
1901	1.12	31.33	9.62	23.	65.07	8.67	241.2
1902	1.996	60.24	20.95	43.1*	126.18	17.24	504.
Average	1.479	47.36	14.6	32.65	96.06	12.84	357.5

*Estimated for 1902 on the assumption that the nitrogen as albuminoid ammonia constitutes 40 per cent of the total organic nitrogen.

MEAN ANNUAL DISCHARGES OF THE ILLINOIS RIVER AT KAMPSVILLE DAM. CORRECTED FOR SUBMERGENCE OF THE WEIR.

1897 .... 16,258 cubic feet per second.
1898 .... 15,947 " " " "
1899 .... 9,497 " " " "
1900 .... 13,033 " " " "
1901 .... 9,506 " " " "
1902 .... 18,306 " " " "

TABLE XX.

QUANTITIES OF NITROGEN IN THE WATERS OF THE ILLINOIS RIVER AT KAMPSVILLE. TONS DISCHARGED PER 24 HOURS; CALCULATED FROM THE AVERAGE FLOW FOR EACH PERIOD OF THREE YEARS AND THE AVERAGE PROPORTION OF THE CONSTITUENT FOR SAME PERIOD.

1st period, 1897-8-9, average flow-13,900 cubic feet per second or 37,530,000 tons of water per 24 hours.

2nd period, 1900-1-2, average flow-13,614 cubic feet per second, or 36,750,000 tons of water per 24 hours.

NITROGEN AS	Parts per million		Tons per 24 hours		Differences
	1st period 1897-8-9	2nd period 1900-1-2	1st period 1897-8-9	2nd period 1900-1-2	
Nitrites.	.067	.0405	2.52	1.49	Decrease 40.8 p. c.
Nitrates	1.103	1.276	41.4	46.9	Increase 13.3 p. c.
Free Ammonia	.3737	.3937	13.95	14.47	Increase 3.7 p. c.
Organic (Kjeldahl)	1.066	.888	40.	32.6	Decrease 18. p. c.
Total Nitrogen	2.6097	2.5982	97.87	95.46	Decrease 2.46 p. c.
Albuminoid Ammonia	.4665	.3495	17.5	12.84	Decrease 30.6 p. c.
Oxygen Consumed	11.7	10.7	438.	393.	Decrease 10.2 p. c.

The evidence seems to show conclusively that since the opening of the Chicago Main Drainage Channel, there has taken place not only a considerable diminution of the proportions of the organic matters contained in the waters of the lower Illinois River, but that a substantial decrease of the actual quantities of the organic matters contained in these waters has occurred, and this notwithstanding the fact, which is shown further along, that the quantities of organic matters conveyed, in Chicago's sewage, into the upper Illinois are greater now than they were before the opening of the Main Drainage Channel.

As it has been shown (see pages 79-82) that the organic matters contained in the Chicago sewage discharged into the upper Illinois are practically destroyed or converted into vegetable matters by the time the waters reached Peoria, where another great influx of sewage and other organic wastes occurs, it will be of interest to compare the condition of the water at Averyville, just above Peoria, with its condition at Kampsville 146 miles below, with respect to the quantities of organic matters carried by the stream at these two points.

TABLE XXI.

QUANTITIES OF NITROGEN IN THE WATERS OF THE ILLINOIS RIVER AT AVERY–VILLE (ABOVE PEORIA.) TONS DISCHARGED PER 24 HOURS. CALCULATED FROM THE MEAN FLOW FOR EACH YEAR AND THE YEARLY AVERAGES OF CONSTITUENTS (SEE TABLE XII PAGE 81.)

Year	Mean Flow of Water.		Nitrogen as						
	Cubic ft. per second	Mil. tons per 24 hrs.	Nit-rites	Nit-rates.	Free Am'ia.	Org'ic Kjeld'l	Total Ni'gen	Albu. Am'ia.	Oxy'n Cons'd
1897	11,173	30.16	7.66	50.97	25.42	30.46	114.51	15.17	340.8
1898	11,923	32.19	3.99	25.97	27.64	23.7	81.3	12.97	299.3
1899	7,378	19.92	4.06	31.	20.41	22.1	77.57	9.84	256.9
Av'e	10,165	27.44	5.24	36.	24.49	25.40	91.12	12.66	299.
1900	12,026	32.47	2.56	51.4	20.75	24.9	99.61	10.48	272.7
1901	9,757	26.34	2.13	35.2	17.02	16.86	71.21	6.55	172.7
Av'e	10,891	29.4	2.34	43.3	18.88	20.88	85.41	8.51	222.6
Changes, or differences between the two periods.			55.34 p.c. dec	16.85 p.c. inc	22.9 p.c.dec	17.86 p.c.dec	6.26 p.c.dec	32.78 p.c.dec	25.55 p.c.dec
Averyville 1897-8-9............			5.24	36.	24.49	25.42	91.12	12.66	299.
Kampsville 1897-8-9............			2.7	41.22	13.82	40.22	97.93	18.28	433.3
Changes between Averyville and Kampsville.......			–48.47 per ct.	*14.5 per ct.	–43.56 per ct.	*62.15 per ct.	* 7.47 per ct.	*44.39 per ct.	*45. per ct.
Averyville 1900-1901...........			2.34	43.3	18.88	20.88	85.41	8.51	222.6
Kampsville 1900-1901...			1.22	40.92	11.24	27.43	81.	10.64	284.1
Changes between Averyville and Kampsville..........			–47.85 per ct.	–5.49 per ct.	–40.46 per ct.	*31.37 per ct.	- 5.16 per ct.	*25.03 per ct.	* 27.68 per ct.

* Increase. – Decrease.

The data of this table (XXI) show that the condition of the water of the Illinois River just above Peoria is very much better since the opening of the Chicago Main Drainage Channel and that the natural destruction of the organic matters discharged into the river in the sewage is, by the time the water reaches Averyville, far more complete than it was at this point prior to the year 1900.

The comparison of the data for Kampsville with those for Averyville shows that for like periods, namely, 1897-8-9 and 1900-1901 (no examinations of the water at Averyville were made in 1902) the actual weights of nitrites and of free ammonia carried by the water of the Illinois decreased more than 40 per cent. during the flow from Averyville to Kampsville.

On the other hand the weights of organic nitrogenous matters as measured by albuminoid ammonia and the Kjeldahl determinations, increased very considerably, though much less (44.39 per cent. and 62.15 per cent, and 25.03 per cent and 31.37 per cent respectively) for the period after opening the canal than for the period prior thereto. Oxygen consumed also increased between these two points, 45 per cent. in the earlier period, 27.68 per cent. in the later.

Inasmuch as the waters of the tributaries of the Illinois contain organic matters in proportions equal to those of the Illinois itself, and as enormous quantities of nitrogenous organic matters are discharged into the Illinois at Peoria and Pekin, a few miles below Averyville, a considerable increase in the quantities of nitrogenous organic matters in the water of the lower Illinois might well be expected, but it is always to be remembered that the organic matters contained in the waters of the Illinois below Havana (45 miles below Peoria and 88 miles above Kampsville) consist of vegetable matters, chiefly those of the plankton, as is shown both by observation and by the results of the general investigations recorded in the body of this report.

THE QUANTITIES OF NITROGENOUS ORGANIC MATTERS DISCHARGED INTO THE DESPLAINES AND THE ILLINOIS RIVERS IN CHICAGO SEWAGE.

It is estimated that, of the sewage produced by the population of Chicago, about eighty-five per cent. is discharged into the Chicago River and thence goes into the Desplaines and Illinois Rivers.

The population of Chicago in 1896 was about 1,450,000 and in 1899, about 1,630,000, the mean for the four years period being 1,542,000. Eighty-five per cent. of this gives as a mean, a population of about 1,310,700 contributing sewage to the river during the period in question.

As it is commonly agreed that the average amount of feces per day per individual inhabitant is about three ounces, and that this contains about thirty grams, approximately one ounce of dry matter, it would appear that, approximately, forty-one tons of dry matters were discharged into the river from this source each twenty-four hours. Similar calculation concerning the quantity of urine and that of the solid matters contained therein, upon the basis of a discharge of about forty ounces of urine per inhabitant per day, would indicate that from this source there were derived about 86 tons of dry maters and the total quantity of dry solids from these sources discharged into the canal every twenty-four hours, would consequently, be about 127 tons.

On the average, about eighty-five per cent. of the solid matters of feces consist of organic matters, the remaining fifteen per cent consisting of mineral matters. The total amount of organic matters from this source then, would be about 36 tons, which together with the organic matters derived from the urine, eighty per cent. of the dry matters or 68.8 tons, would equal about 104.8 tons, of which about 34 tons consist of urea.

For a population of 1,310,700 contributing sewage to the canal, the quantity of nitrogen derived from these sources, calculated on the basis of the excretion of 14.2 grams of nitrogen per inhabitant per day, the figures of Heiden quoted in Konig, would be 18,612 kilograms or 20.5 tons of nitrogen per twenty-four hours. Much of the other refuse and wastes contained in the sewage of the city is nitrogenous but the quantities of such matters, although certainly very large, are not known even very approximately.

The Quantities of Nitrogen and Organic Matters Discharged by the Waters of the Illinois and Michigan Canal and the Sanitary Canal.

The analytical data of Table III, page 67, show that the average proportion of nitrogen as free ammonia for the four years, 1896–1899, was 13.5 parts per million, and the total organic nitrogen (by Kjeldahl) 5.3 parts per million.

The average volume pumped into the canal, assumed to be 36,000 cu. ft. per minute, amounts to 1,623,000 tons of water or sewage per twenty-four hours, which gives us the factor 1.623 for calculating the total weight of nitrogen carried in the canal. We thus find that the discharge of nitrogen as ammonia (13.5 x 1.623) was 21.9 tons per day, and the total organic nitrogen (5.3 x 1.623) equal to 8.6 tons per day, the sum 30.5 tons, being fifty per cent more than the 20.5 tons of nitrogen excreted by the population contributing to the sewage of the canal.

The 8.6 tons of total organic nitrogen represent 53.75 tons of protein or nitrogenous organic matters, and the 21.9 tons of nitrogen as free ammonia, if presumed to have been originally in the form of protein, would represent 136.9 tons of nitrogenous organic matters. Upon this basis, the total quantities of nitrogenous organic matters discharged through the old canal before the opening of the drainage channel would amount to 190.7 tons per twenty-four hours, a quantity very considerably in excess of the nitrogenous matters derived from ordinary sewage calculated upon the above basis (page x). A comparatively small part of this difference is ascribable to the contribution to the sewage of other household wastes than those contained in the feces and urine, the major part doubtless being due to the contribution of industrial wastes, particularly the drainage of the stockyards district.

It is to be borne in mind that the thirty-four tons of urea contained originally in the sewage conveyed to the canal correspond to 15.7 tons of nitrogen, and that the major part of the 21.9 tons of nitrogen as free ammonia contained in the canal waters was derived from this source and not from the more complex nitrogenous organic matters or proteid bodies.

The quantities of organic matters contained in the waters of the canal, however, were undoubtedly far less than the total quantities of these matters discharged into the river by the proportion of the population considered, the difference being in very large measure due to the putrefactive changes which begin in the sewers and proceed actively in the river.

The changes which formerly occurred in the waters of the Chicago River were similar in most respects to those which take place in the so-called septic tanks, and served to destroy much of the organic matter, some of it being converted into comparatively inoffensive sludge, and another portion into gaseous substances which partly escaped into the air, some of them characterized by disagreeable odors, but others, as free ammonia, carbon dioxide, nitrogen, hydrogen, etc., being inoffensive.

The fact that ordinarily there was but very slight difference between the quantities of these matters contained in the water of the canal at Lockport, and the quantities contained at Bridgeport, would appear to indicate that the putrefactive or septic changes which went on in the river proceeded approximately as far as, under these conditions, it was possible that they should go, and that the matters remaining in the waters of the canal were in proper condition for the speedy inception of those changes which mark the next step in the oxidation of the nitrogenous organic matters and their transformation into innocuous products.

That is to say, the putrefactive changes appear to have approached completion, and the conditions become such that no farther changes took place rapidly within the canal itself, but the next succeeding step was facilitated by dilution of the sewage and perhaps, also, by the introduction of bacterial forms of a different character, derived from or contained in the diluting waters of streams tributary to the Desplaines and the Illinois, or in the waters of the upper Desplaines when these waters were sufficient in volume to have marked diluting effect upon the concentrated but ripened sewage discharged from the canal.

Since the opening of the Sanitary Canal, the larger part of Chicago's sewage experiences its initial dilution in the Chicago river and passes through the Main Drainage Channel, in which the mean daily flow for 1900 was 188,340, for 1901 241,323 and for 1902 257,006 cubic feet per minute.

The volume of sewage pumped into the Illinois and Michigan Canal, which is now intended to subserve purposes of navigation only, was reduced from the former average of 36,000 cubic feet per minute to 26,700 cubic feet per minute in 1900 and to about 23,000 cubic feet per minute during the seven months May-November inclusive in 1901, the pumps standing inactive during the other months of 1901. (See discharge curves, Plates XXXVII and XXXVIII.) Throughout 1900 and during such part of 1901 as the pumps were in operation, the Illinois and Michigan Canal discharged 40 to 45 per cent. of the nitrogen contained in that part of Chicago's sewage which is conveyed into the Illinois river, the other 55 to 60 per cent. during this period passing through the Main Drainage Channel.

That the disposition, that is the destruction of the organic matters of the sewage by the natural processes which are in operation in the waters of the Sanitary Canal, the Desplaines River and the Illinois River, are facilitated by the increased dilution effected by the operation of the Main Drainage Channel, has been conclusively demonstrated by the investigation of the waters of the Illinois River at Averyville and Kampsville. (See pages 80 and 100 and appendix, v-viii.)

The data in the following tables have been calculated from the average daily flows for each month in each canal, and the monthly averages of the analytical data.

TABLE XXII.

QUANTITIES OF NITROGEN DISCHARGED INTO THE ILLINOIS RIVER IN CHICAGO SEWAGE. NITROGEN AS FREE AMMONIA DISCHARGED IN THE WATER OF THE ILLINOIS AND MICHIGAN CANAL AND THE SANITARY CANAL. TONS PER 24 HOURS.

	1900			1901		
	I. & M.	Sanitary	Sum.	I.&M.	Sanitary	Sum.
Jan.	17.8	25.87	43.67	———	26.54	26.54
Feb.	10.97	20.58	31.55	———	21.62	21.63
Mar.	16.7	15.3	32.	———	16.7	16.7
Apr.	17.94	8.	25.94	———	20.28	20.28
May	15.77	10.	25.77	16.1	10.67	26.77
June	19.71	12.7	32.41	15.9	11.08	26.98
July	11.43	13.5	24.93	15.7	16.2	31.9
Aug.	15.9	19.5	35.4	19.5	16.33	35.83
Sept.	25.1	8.7	33.8	21.9	18.09	39.99
Oct.	9.4	8.9	18.3	35.2	16.1	51.3
Nov.	11.6	11.5	23.1	14.75	14.11	28.86
Dec.	5.69	13.5	19.19	———	35.98	35.98
Year	14.83	14.	28.84	19.86 7 months	16.85	30.23
Mean Flow cu. ft. min	26,768	188 340		23,000	242.323	

Average Illinois and Michigan Canal 1896-9—21.9. } Mean flow 36,000 cu. ft. min.
Average Illinois and Michigan Canal, 1899—22.5. }

Of the Nitrogen as free Ammonia above, .2 ton per 24 hours was contained in the diluting Lake water drawn through the Chicago river.

TABLE XXIII.

QUANTITIES OF NITROGEN DISCHARGED INTO THE ILLINOIS RIVER IN CHICAGO SEWAGE. TOTAL ORGANIC NITROGEN DISCHARGED IN THE WATERS OF THE ILLINOIS AND MICHIGAN CANAL AND THE SANITARY CANAL. TONS PER 24 HOURS.

	1900			1901		
	I. & M.	Sanitary	Sum.	I. & M.	Sanitary	Sum,
Jan.	9.12	7.37	16.49	———	12.52	12.52
Feb.	7.13	5.48	12.61	———	20.71	20.71
Mar.	8.77	5.71	14.48	———	27.91	27.91
Apr.	6.26	6.54	12.8	———	8.9	8.9
May	3.52	6.98	10.5	2.85	6.7	9.55
June	3.2	6.75	9.95	2.25	7.93	9.18
July	1.85	7.38	9.23	1.65	7.39	9.04
Aug.	2.82	10.67	13.49	2.56	8.99	11.55
Sept.	3.94	5.97	9.91	2.11	7.92	10.03
Oct.	3.09	6.09	9.18	2.26 }	7.79 }	10.05
Nov.	3.72	10.17	13.89	2.26 }	7.79 }	10.05
Dec.	2.85	11.67	14.53	———	17.51	17.51
Year	4.69	7.56	12.25	2.26	11.84	13.08

Average, Illinois and Michigan Canal 1896-9—8.6.
Average Illinois and Michigan Canal 1899—9.

Of the total organic nitrogen above. 2. tons per 24 hours were contained in the diluting Lake water drawn through the Chicago River.

TABLE XXIV.

QUANTITIES OF NITROGEN DISCHARGED INTO THE ILLINOIS RIVER IN CHICAGO SEWAGE. TOTAL NITROGEN: i.e. SUM OF THE NITROGEN AS FREE AMMONIA AND THE TOTAL ORGANIC NITROGEN DISCHARGED BY THE TWO CANALS. TONS PER 24 HOURS.

	1900			1901		
	Free Ammonia	Total Organic Nitrogen	Total Nitrogen Sum.	Free Ammonia	Total Organic Nitrogen	Total Nitrogen Sum.
Jan.	43.67	16.49	60.16	26.54	12.52	39,06
Feb.	31.55	12.61	44.16	21.62	20.71	42.33
Mar.	32.	14.48	46.48	16.7	27.91	44.61
Apr.	25.94	12.8	38.74	20.28	8.9	29.18
May	25.77	10.5	36.27	26.77	9.55	36.32
June	32.41	9.95	42.36	26.98	9.18	36.16
July	24.93	9.23	34.16	31.9	9.04	40.94
Aug.	35.4	13.49	48.89	35.83	11.53	47.38
Sept.	33.8	9.91	43.71	39.99	10.03	50.02
Oct.	18.3	9.18	27.48	51.3	10.05	61.35
Nov.	23.1	13.89	38.99	28.86	10.05	38.91
Dec.	19.19	14.53	33.72	35.98	17.51	53.49
Year	28.84	12.25	41.09	30.23	13.08	43.31

Average, Illinois and Michigan Canal 1891-9—30.5.

Average, Illinois and Michigan Canal, 1899—31.6.

Of the total Nitrogen above, 2.2 tons were contained in the diluting Lake water drawn through the Chicago river.

$\frac{(41.09+43.31-4.4)}{2}$ =40. tons, the average quantity discharged into the Desplaines and thence into the Illinois river, or 31.1 per cent more than the average for the four preceding years and 26.5 per cent more than in 1899.

The increase in the quantities of nitrogen discharged into the Desplaines river through the two canals at Lockport and Joliet, is in part due to the increase in the population and industries contributing to Chicago's sewage, and in part due to the fact that a considerable proportion of the contents of the Chicago river was formerly, from time to time, discharged into the lake, but is now through the operation of the drainage channel, sent into the Desplaines.

SEWAGE OF PEORIA AND PEKIN.—The sewage of Peoria includes the sanitary and house sewage of about 55,000 inhabitants, to which there must be added a portion of the sewage from the 10,000 inhabitants of Pekin and the 8,000 inhabitants of various other small towns about Peoria. The substances contained in the house sewage constitute but a small part of the refuse matters which enter the river at or near Peoria, for vastly greater quantities of waste organic matters are derived from the various industries which find their center in this vicinity, particularly the breweries, and the distilleries with adjacent cattle sheds, the glucose factories, etc.

At Pekin and Peoria from 40,000 to 50,000 cattle are fed upon distillery slops; the refuse from the stables nearly all finds its way into the river, although in recent years a portion of it is filtered and the solid matters used as fertilizers.

The glucose factories use 50,000 or 60,000 bushels of corn daily, and the distilleries about 22,000 bushels, making a total of about 70,000 bushels of corn daily.

It is probable that from 7 to 10 per cent. of the weight of the corn used, including the larger part of the nitrogenous constituents of the grain, amounting to about 200 tons of dry waste organic matters from these sources are discharged into the Illinois River at Peoria and Pekin every 24 hours throughout the year.

A straw board factory at Peoria runs about 27 tons of refuse matters into the river daily, of which 19 tons are organic matters.

It is stated in Konig and elsewhere that the solid matter in the feces of cattle amount to about thirty-six times the quantity derived from the same number of human beings. On this basis, the 40,000 cattle which are fed at Peoria and Pekin, the excretions from which go into the river, produce sewage equivalent to that produced by 1,600,000 human beings, so that the total waste matters introduced into the river at this point would correspond to the ordinary house sewage of about 2,000,000 persons.

It would seem that the wastes introduced into the Illinois at these points are as considerable in amount and as offensive in character as are those introduced in the sewage of Chicago, and indeed in times of low water the condition of the Illinois River between Peoria and Pekin and below Pekin, was often fully as bad as the condition of the Chicago River in the times of its most notorious offensiveness.

Plate V.

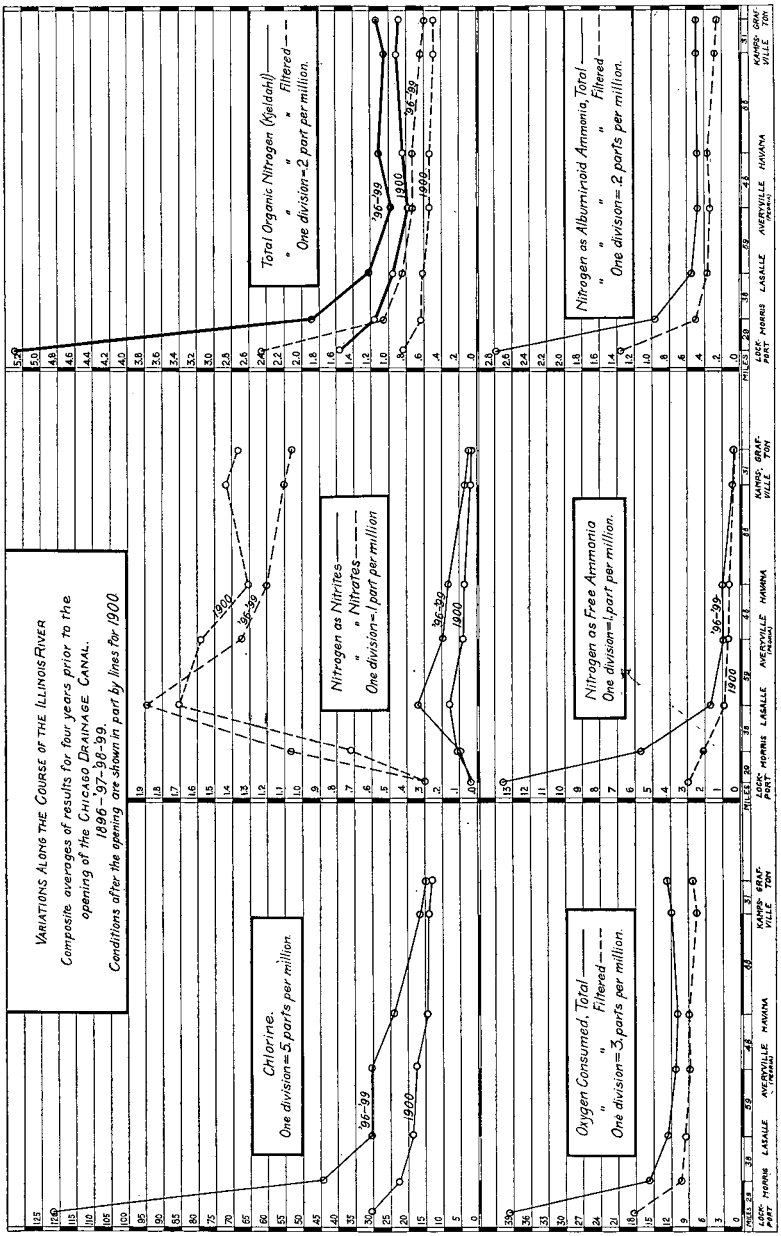

VARIATIONS ALONG THE COURSE OF THE ILLINOIS RIVER
Composite averages of results for four years prior to the opening of the CHICAGO DRAINAGE CANAL.
1896-'97-'98-'99.
Conditions after the opening are shown in part by lines for 1900.
Chlorine.
One division = 5 parts per million.
Nitrogen as Nitrites ———
" " Nitrates - - -
One division = .1 part per million
Total Organic Nitrogen (Kjeldahl) ———
" " " Filtered - - -
One division = .2 part per million.
Oxygen Consumed, Total ———
" " Filtered - - -
One division = 3 parts per million.
Nitrogen as Free Ammonia
One division = .1 part per million.
Nitrogen as Albuminoid Ammonia, Total ———
" " " " Filtered - - -
One division = .2 parts per million.
'96-'99
1900
MILES
LOCKPORT
MORRIS
LASALLE
AVERYVILLE (PEORIA)
HAVANA
KAMPSVILLE
GRAFTON

Plate VI.

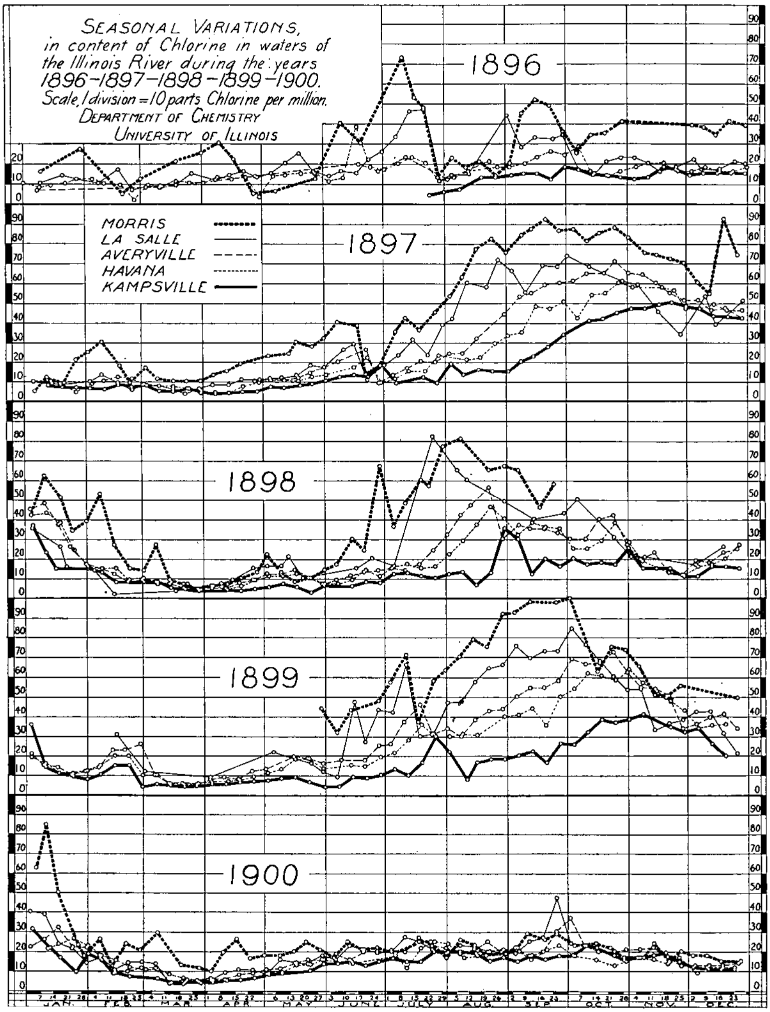
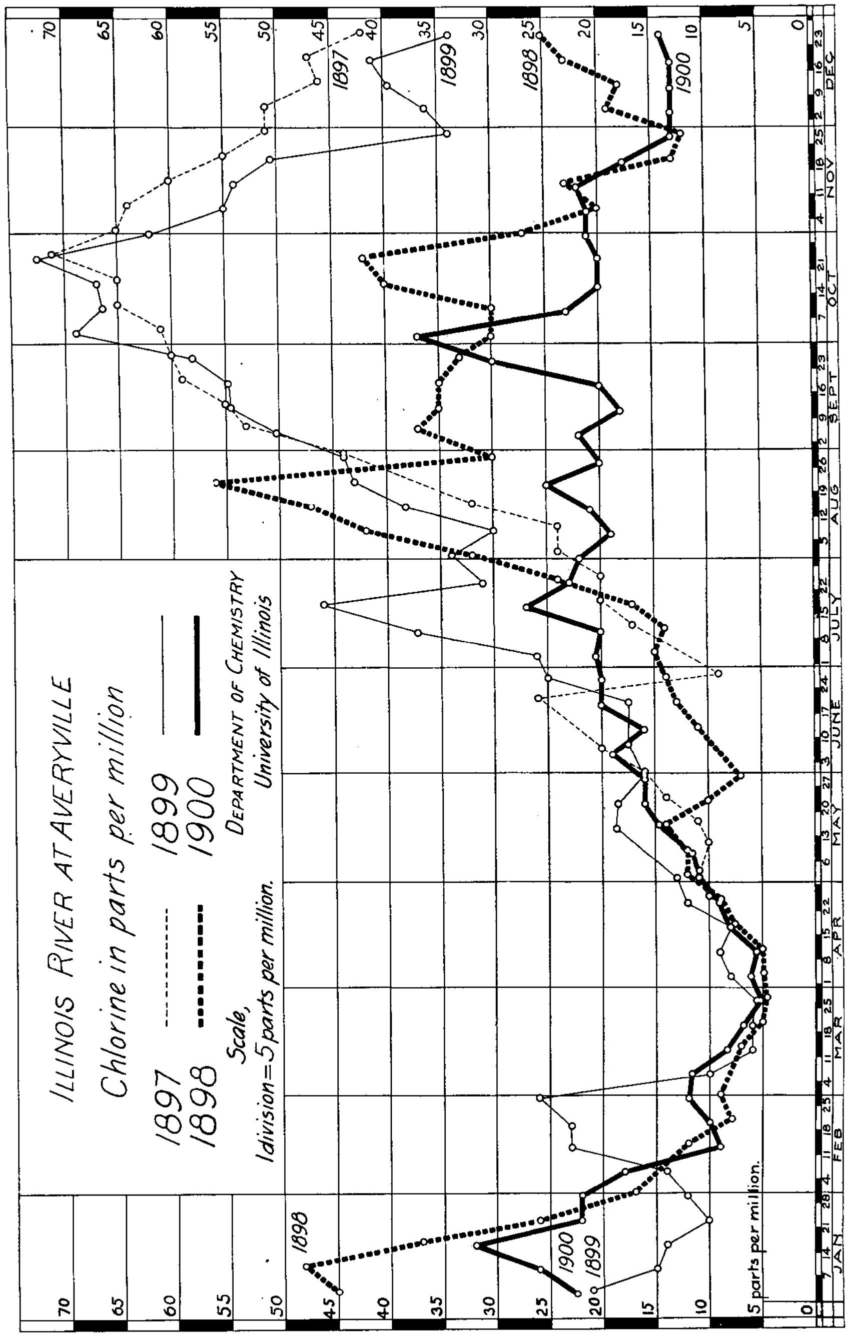
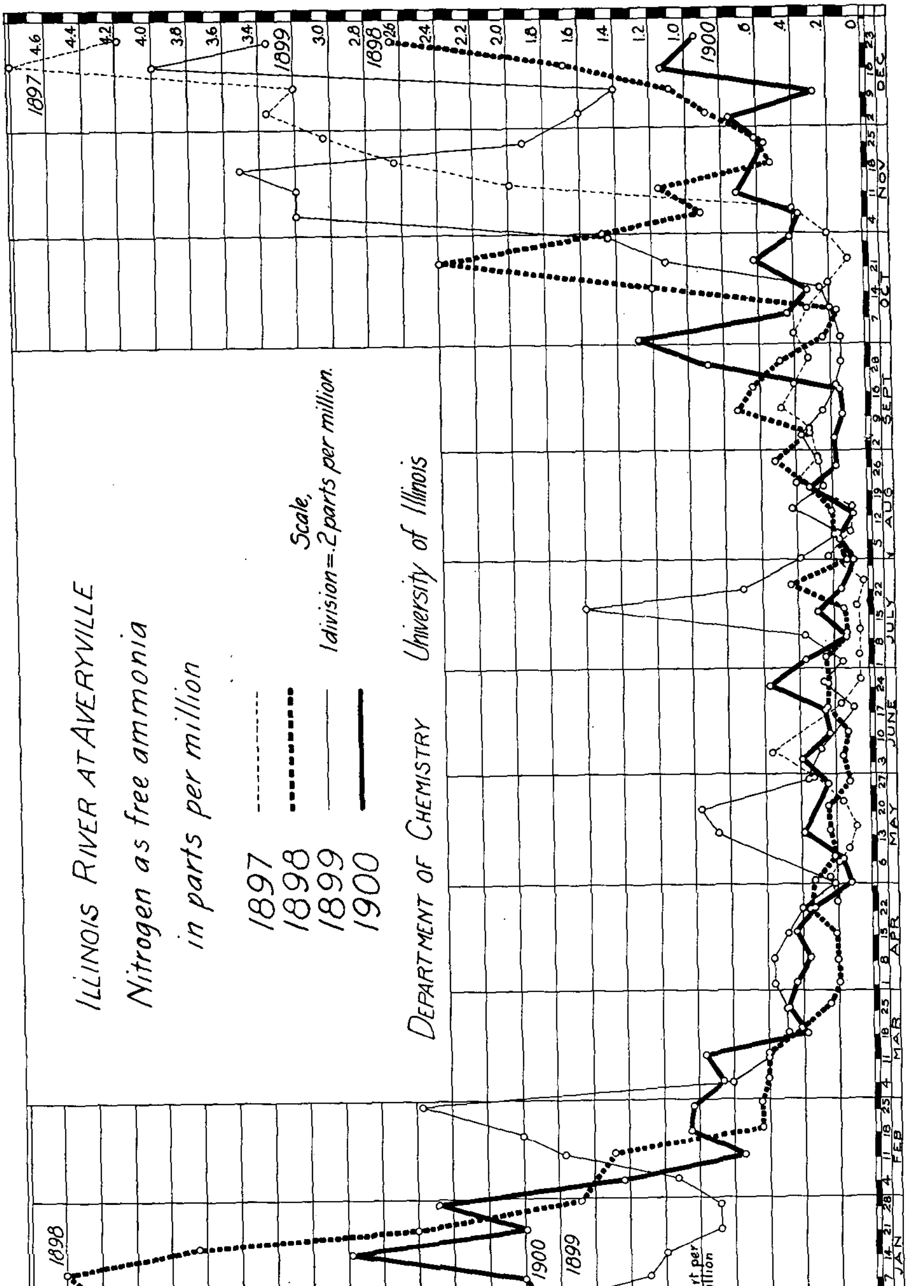

SEASONAL VARIATIONS,
in content of Chlorine in waters of
the Illinois River during the years
1896-1897-1898-1899-1900.
Scale, 1 division = 10 parts Chlorine per million.
DEPARTMENT OF CHEMISTRY
UNIVERSITY OF ILLINOIS
1896
1897
1898
1899
1900
MORRIS
LA SALLE
AVERYVILLE
HAVANA
KAMPSVILLE

Plate VII



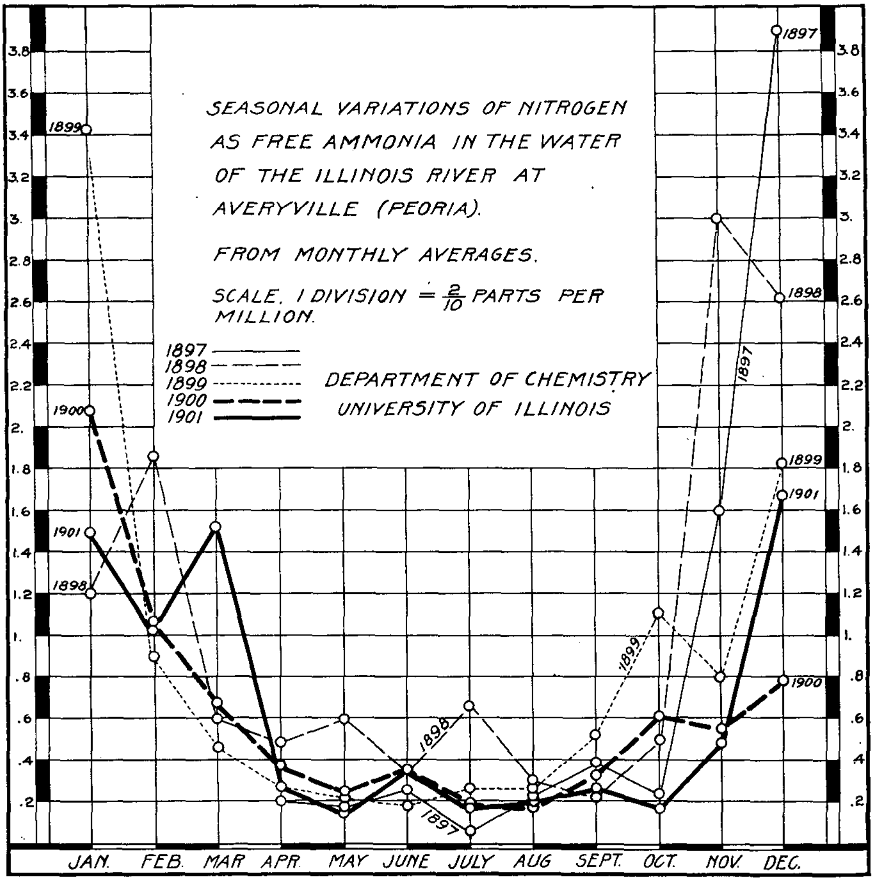
Illinois River at Averyville
Chlorine in parts per million
1897
1898
1899
1900
Scale, 1 division = 5 parts per million.
Department of Chemistry
University of Illinois
5 parts per million.
JAN
FEB
MAR
APR
MAY
JUNE
JULY
AUG
SEPT
OCT
NOV
DEC

Plate VIII.



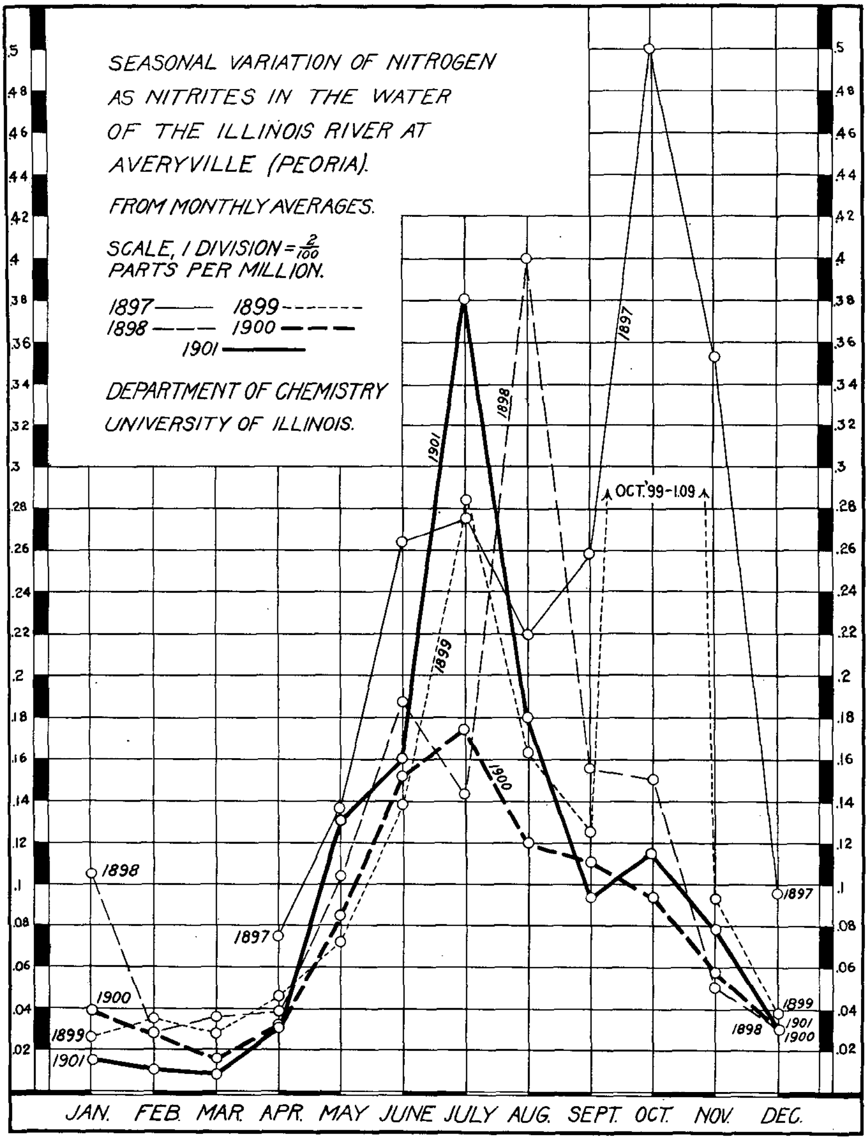
ILLINOIS RIVER AT AVERYVILLE
Nitrogen as free ammonia
in parts per million
1897
1898
1899
1900
Scale,
1 division = .2 parts per million.
DEPARTMENT OF CHEMISTRY
University of Illinois
1 part per million
JAN FEB MAR APR MAY JUNE JULY AUG SEPT OCT NOV DEC

Plate IX.



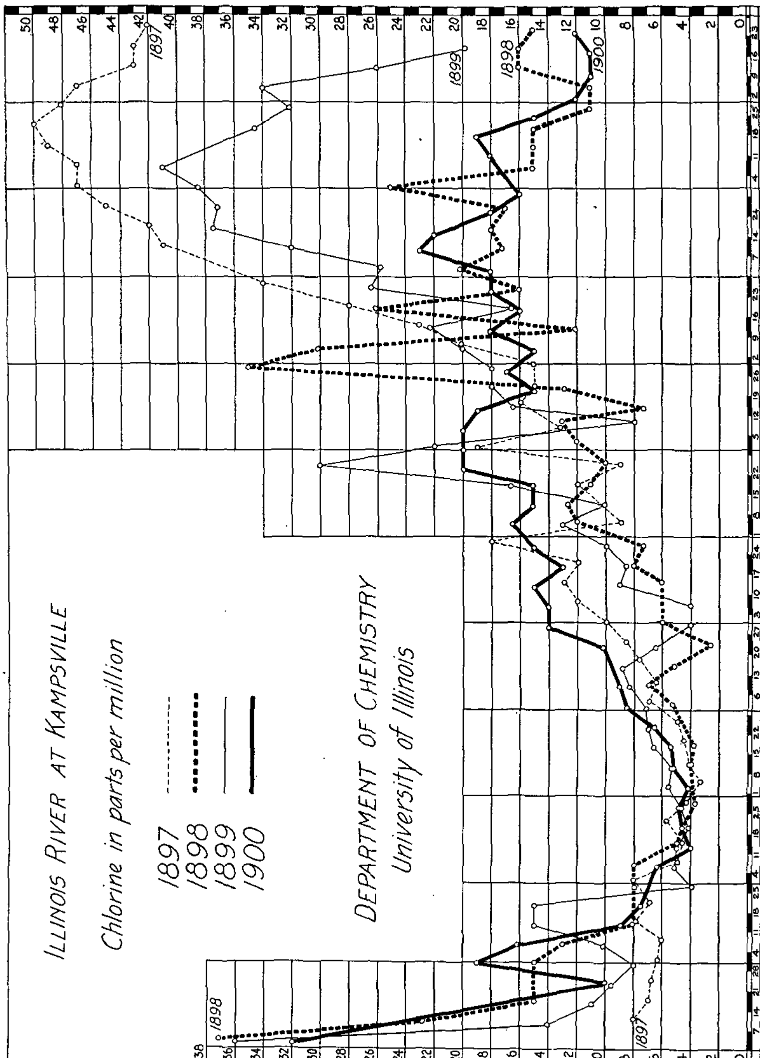
SEASONAL VARIATIONS OF NITROGEN AS FREE AMMONIA IN THE WATER OF THE ILLINOIS RIVER AT AVERYVILLE (PEORIA).
FROM MONTHLY AVERAGES.
SCALE. 1 DIVISION = 2/10 PARTS PER MILLION.
1897
1898
1899
1900
1901
DEPARTMENT OF CHEMISTRY
UNIVERSITY OF ILLINOIS
3.8
3.6
3.4
3.2
3.
2.8
2.6
2.4
2.2
2.
1.8
1.6
1.4
1.2
1.
.8
.6
.4
.2
JAN.
FEB.
MAR.
APR.
MAY
JUNE
JULY
AUG.
SEPT.
OCT.
NOV.
DEC.

Plate X.



SEASONAL VARIATION OF NITROGEN AS NITRITES IN THE WATER OF THE ILLINOIS RIVER AT AVERYVILLE (PEORIA).
FROM MONTHLY AVERAGES.
SCALE, 1 DIVISION = 2/100 PARTS PER MILLION.
1897
1899
1898
1900
1901
DEPARTMENT OF CHEMISTRY
UNIVERSITY OF ILLINOIS.
OCT.'99-1.09
JAN. FEB. MAR. APR. MAY JUNE JULY AUG. SEPT. OCT. NOV. DEC.

Plate XI.



ILLINOIS RIVER AT KAMPSVILLE
Chlorine in parts per million
1897
1898
1899
1900
DEPARTMENT OF CHEMISTRY
University of Illinois
JAN FEB MAR APR MAY JUNE JULY AUG SEPT OCT NOV DEC

Plate XII

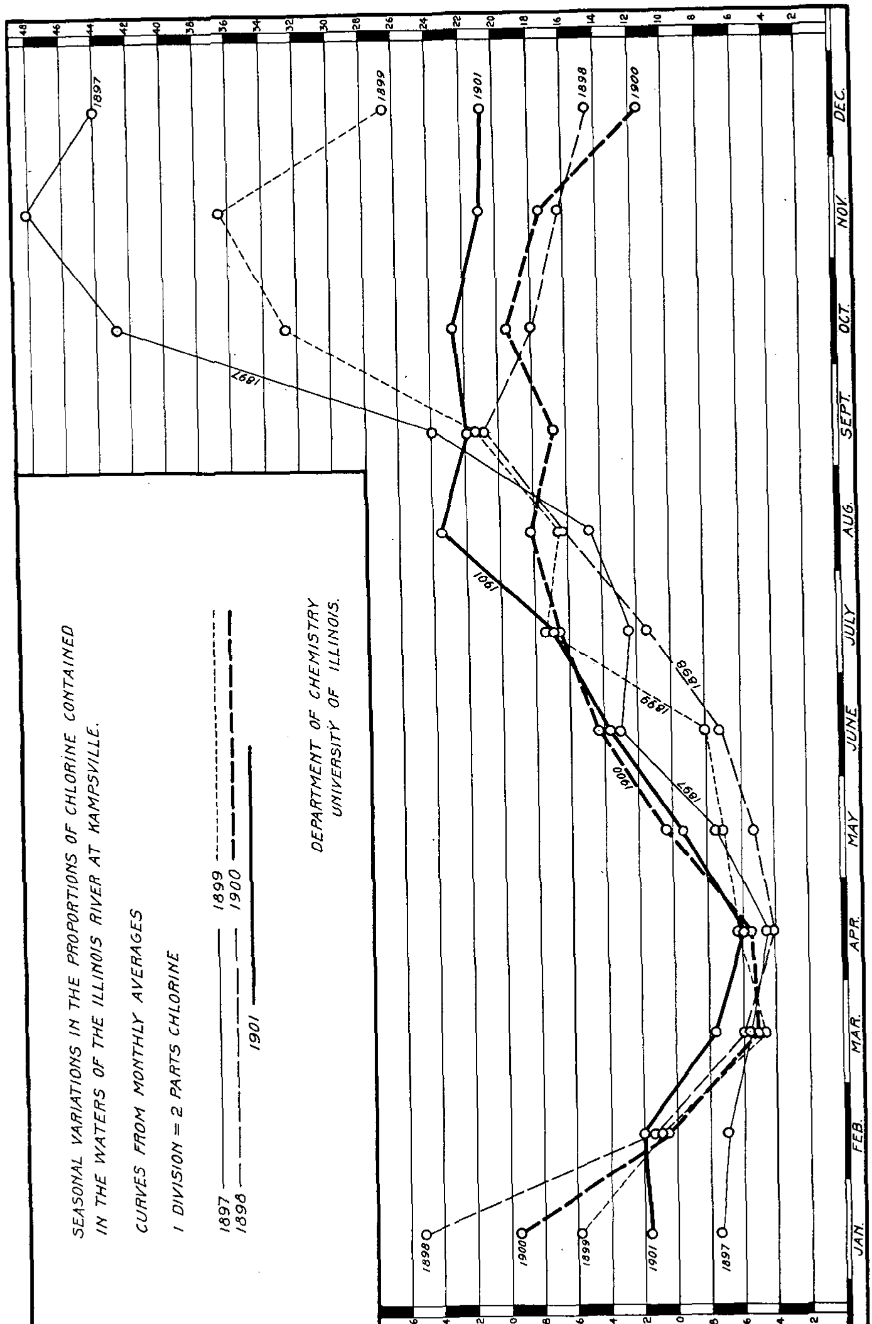

SEASONAL VARIATIONS IN THE PROPORTIONS OF CHLORINE CONTAINED IN THE WATERS OF THE ILLINOIS RIVER AT KAMPSVILLE.
CURVES FROM MONTHLY AVERAGES
1 DIVISION = 2 PARTS CHLORINE
1897
1898
1899
1900
1901
DEPARTMENT OF CHEMISTRY
UNIVERSITY OF ILLINOIS.
JAN.
FEB.
MAR.
APR.
MAY
JUNE
JULY
AUG.
SEPT.
OCT.
NOV.
DEC.

Plate XIII.

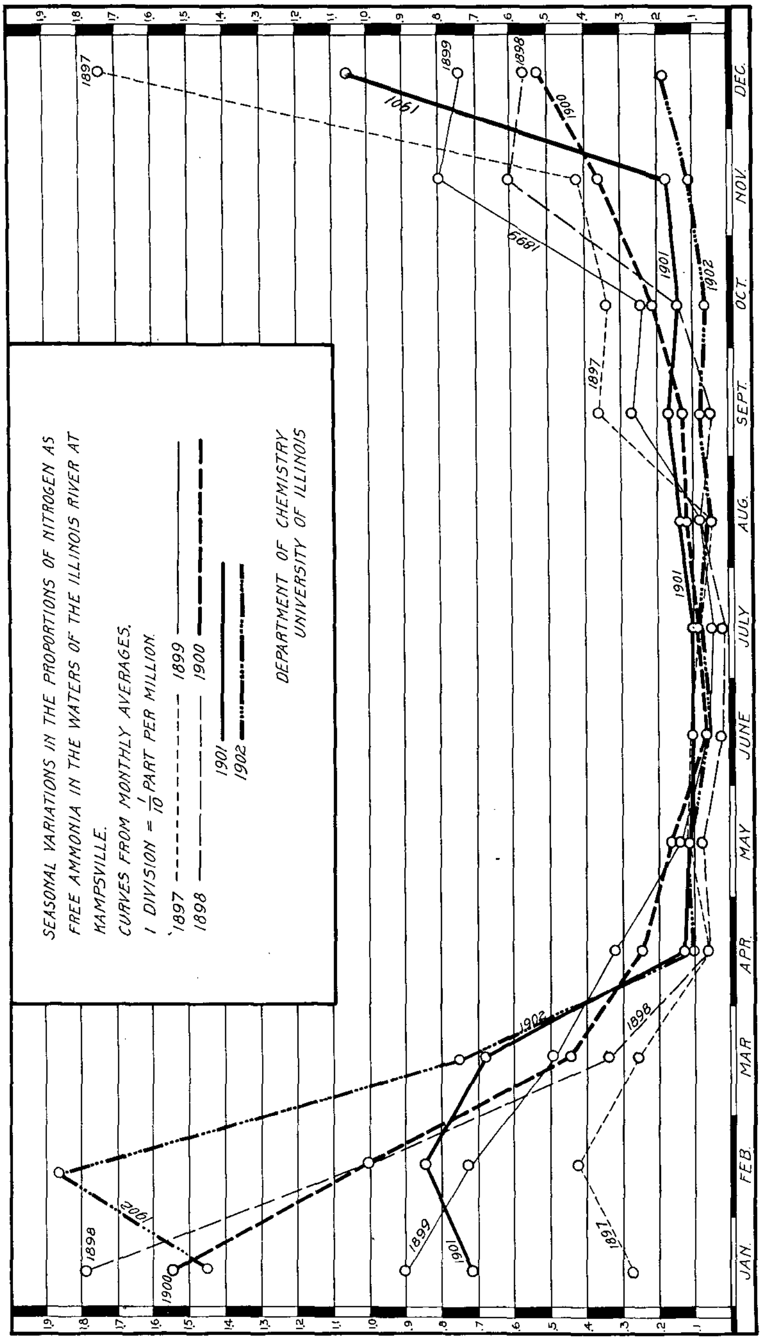

SEASONAL VARIATIONS IN THE PROPORTIONS OF NITROGEN AS FREE AMMONIA IN THE WATERS OF THE ILLINOIS RIVER AT KAMPSVILLE.
CURVES FROM MONTHLY AVERAGES.
1 DIVISION = 1/10 PART PER MILLION.
1897
1898
1899
1900
1901
1902
DEPARTMENT OF CHEMISTRY
UNIVERSITY OF ILLINOIS
JAN.
FEB.
MAR.
APR.
MAY
JUNE
JULY
AUG.
SEPT.
OCT.
NOV.
DEC.

Plate XIV

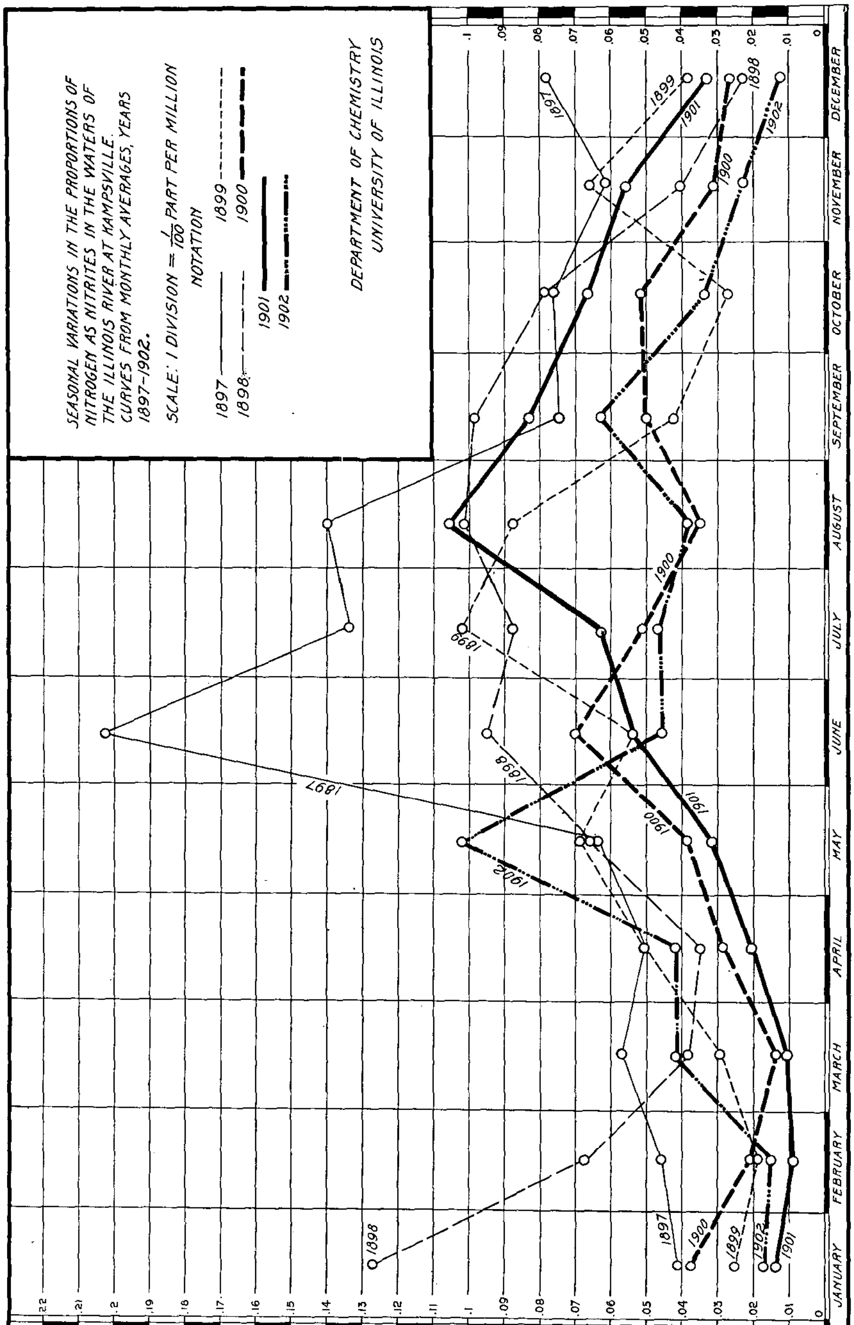

SEASONAL VARIATIONS IN THE PROPORTIONS OF NITROGEN AS NITRITES IN THE WATERS OF THE ILLINOIS RIVER AT KAMPSVILLE. CURVES FROM MONTHLY AVERAGES, YEARS 1897-1902.
SCALE: 1 DIVISION = 1/100 PART PER MILLION
NOTATION
1897
1898
1899
1900
1901
1902
DEPARTMENT OF CHEMISTRY
UNIVERSITY OF ILLINOIS
JANUARY
FEBRUARY
MARCH
APRIL
MAY
JUNE
JULY
AUGUST
SEPTEMBER
OCTOBER
NOVEMBER
DECEMBER
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
.2
.21
.22

Plate XV.

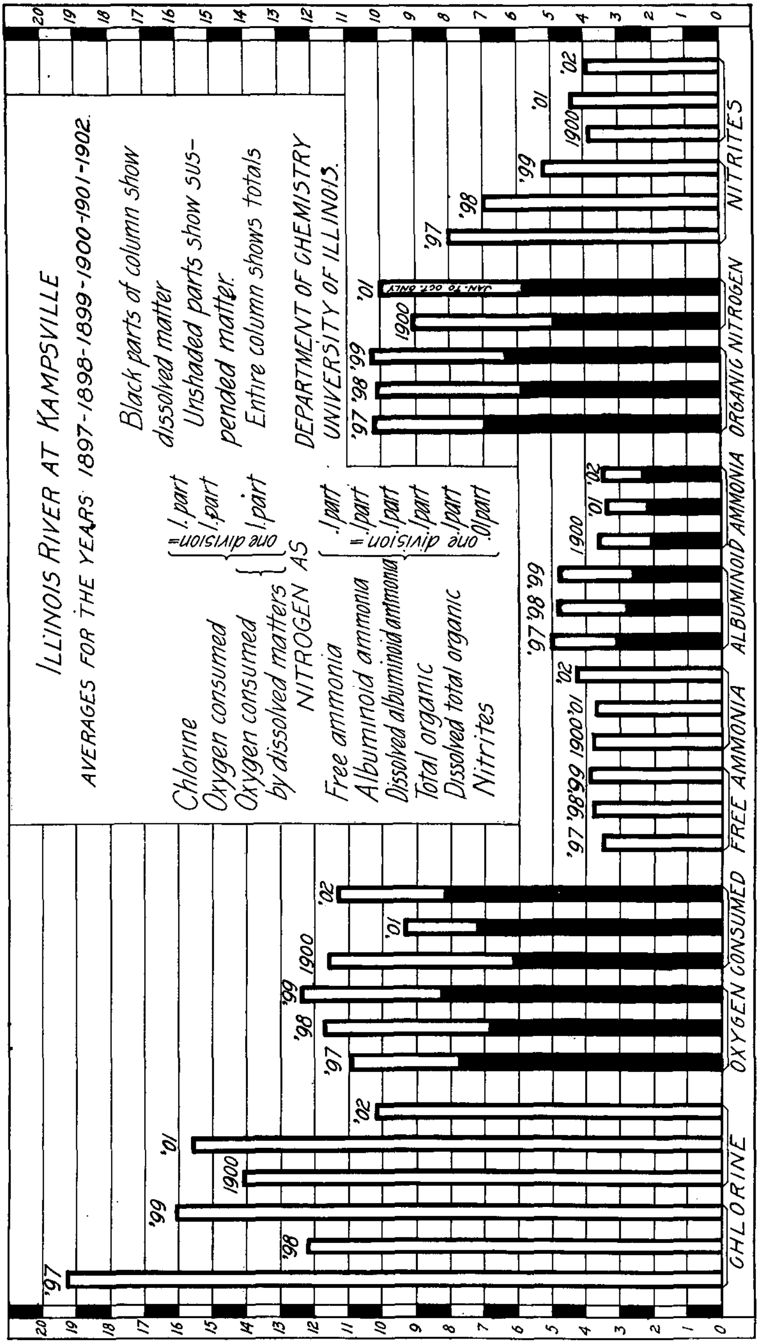

ILLINOIS RIVER AT KAMPSVILLE
AVERAGES FOR THE YEARS 1897-1898-1899-1900-1901-1902.
Black parts of column show dissolved matter
Unshaded parts show suspended matter.
Entire column shows totals
DEPARTMENT OF CHEMISTRY UNIVERSITY OF ILLINOIS.
Chlorine
Oxygen consumed
Oxygen consumed by dissolved matters
NITROGEN AS
Free ammonia
Albuminoid ammonia
Dissolved albuminoid ammonia
Total organic
Dissolved total organic
Nitrites
one division = 1. part
1. part
1. part
.1 part
.1 part
.1 part
.1 part
.1 part
.01 part
JAN. TO OCT. ONLY
CHLORINE
OXYGEN CONSUMED
FREE AMMONIA
ALBUMINOID AMMONIA
ORGANIC NITROGEN
NITRITES

Plate XVI.

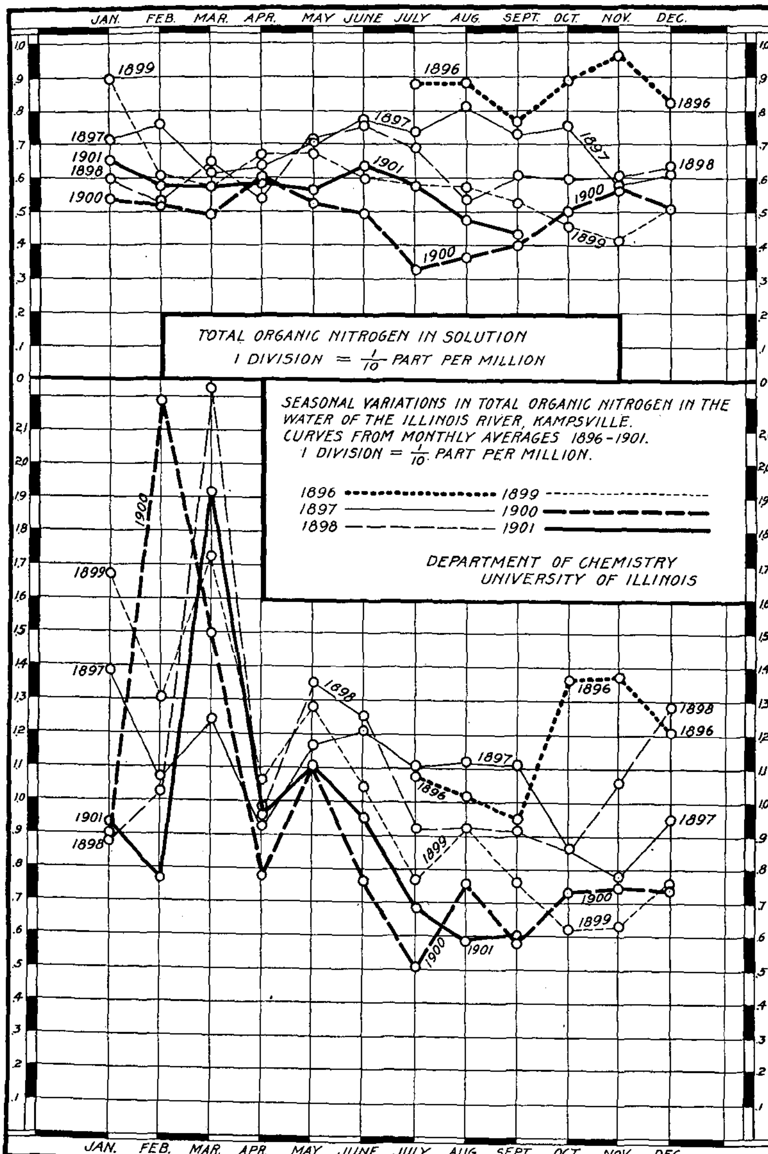

JAN. FEB. MAR. APR. MAY JUNE JULY AUG. SEPT. OCT. NOV. DEC.
TOTAL ORGANIC NITROGEN IN SOLUTION
1 DIVISION = 1/10 PART PER MILLION
SEASONAL VARIATIONS IN TOTAL ORGANIC NITROGEN IN THE WATER OF THE ILLINOIS RIVER, KAMPSVILLE.
CURVES FROM MONTHLY AVERAGES 1896-1901.
1 DIVISION = 1/10 PART PER MILLION.
1896 1899
1897 1900
1898 1901
DEPARTMENT OF CHEMISTRY
UNIVERSITY OF ILLINOIS

Plate XVII.

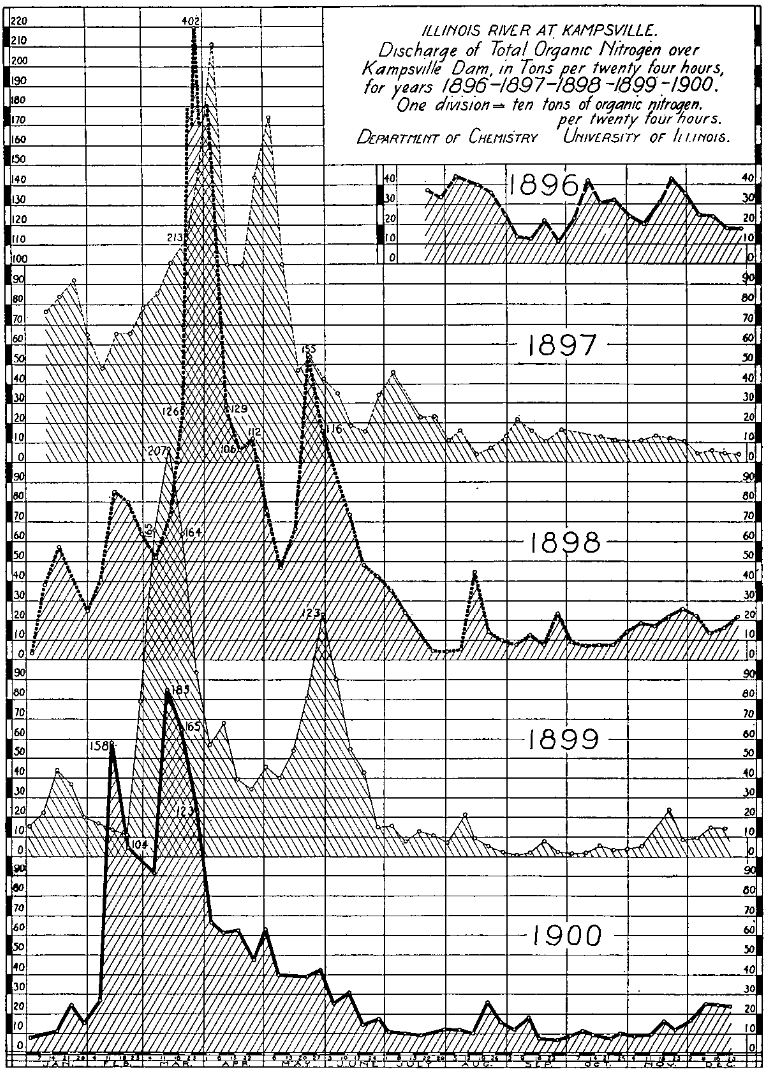
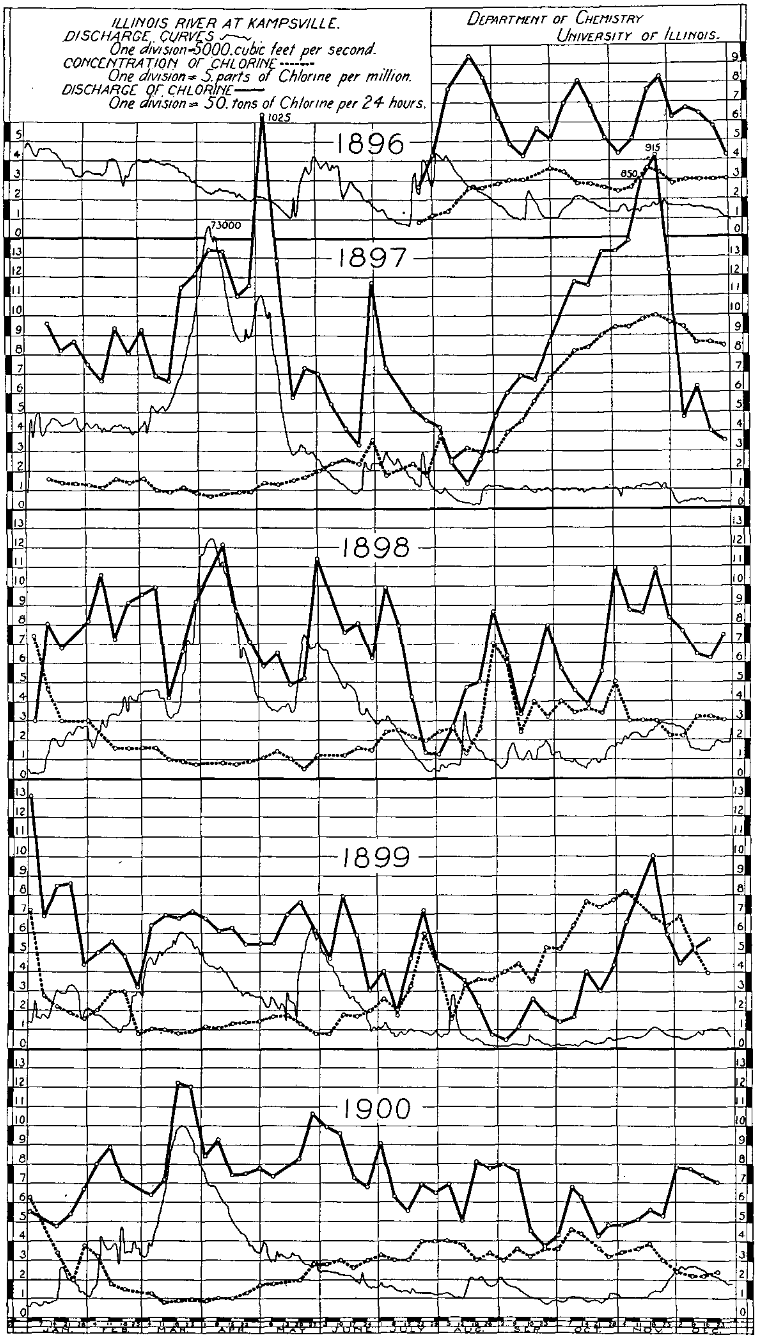
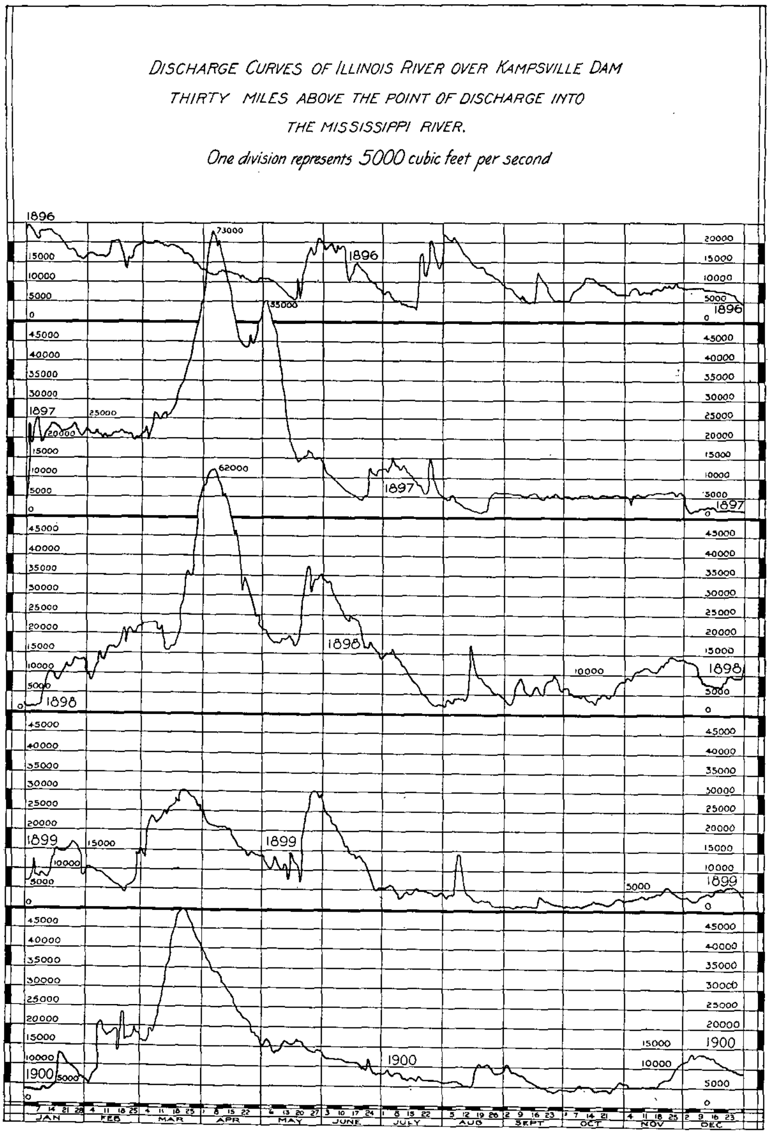

ILLINOIS RIVER AT KAMPSVILLE.
Discharge of Total Organic Nitrogen over Kampsville Dam, in Tons per twenty four hours, for years 1896-1897-1898-1899-1900.
One division = ten tons of organic nitrogen. per twenty four hours.
DEPARTMENT OF CHEMISTRY UNIVERSITY OF ILLINOIS.
1896
1897
1898
1899
1900
JAN. FEB. MAR. APR. MAY JUNE JULY AUG. SEP. OCT. NOV. DEC.

Plate XVIII.



ILLINOIS RIVER AT KAMPSVILLE.
DISCHARGE CURVES
One division=5000. cubic feet per second.
CONCENTRATION OF CHLORINE
One division = 5. parts of Chlorine per million.
DISCHARGE OF CHLORINE
One division = 50. tons of Chlorine per 24 hours.
DEPARTMENT OF CHEMISTRY
UNIVERSITY OF ILLINOIS.
1896
1897
1898
1899
1900
1025
915
850
73000
JAN. FEB. MAR. APR. MAY JUNE JULY AUG. SEP. OCT. NOV. DEC.

Plate XIX.



DISCHARGE CURVES OF ILLINOIS RIVER OVER KAMPSVILLE DAM
THIRTY MILES ABOVE THE POINT OF DISCHARGE INTO
THE MISSISSIPPI RIVER.
One division represents 5000 cubic feet per second
1896
1897
1898
1899
1900
73000
35000
62000
JAN
FEB
MAR
APR
MAY
JUNE
JULY
AUG
SEPT
OCT
NOV
DEC

Plate XX

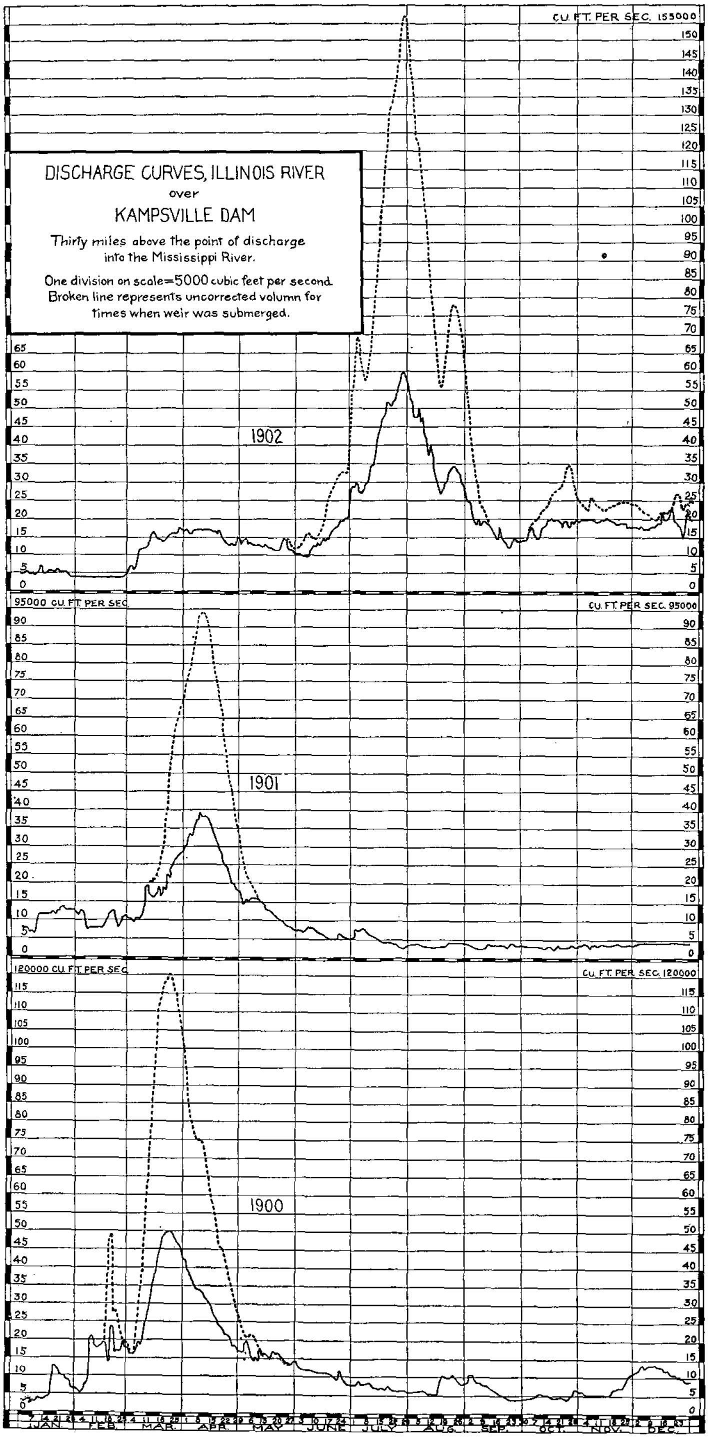
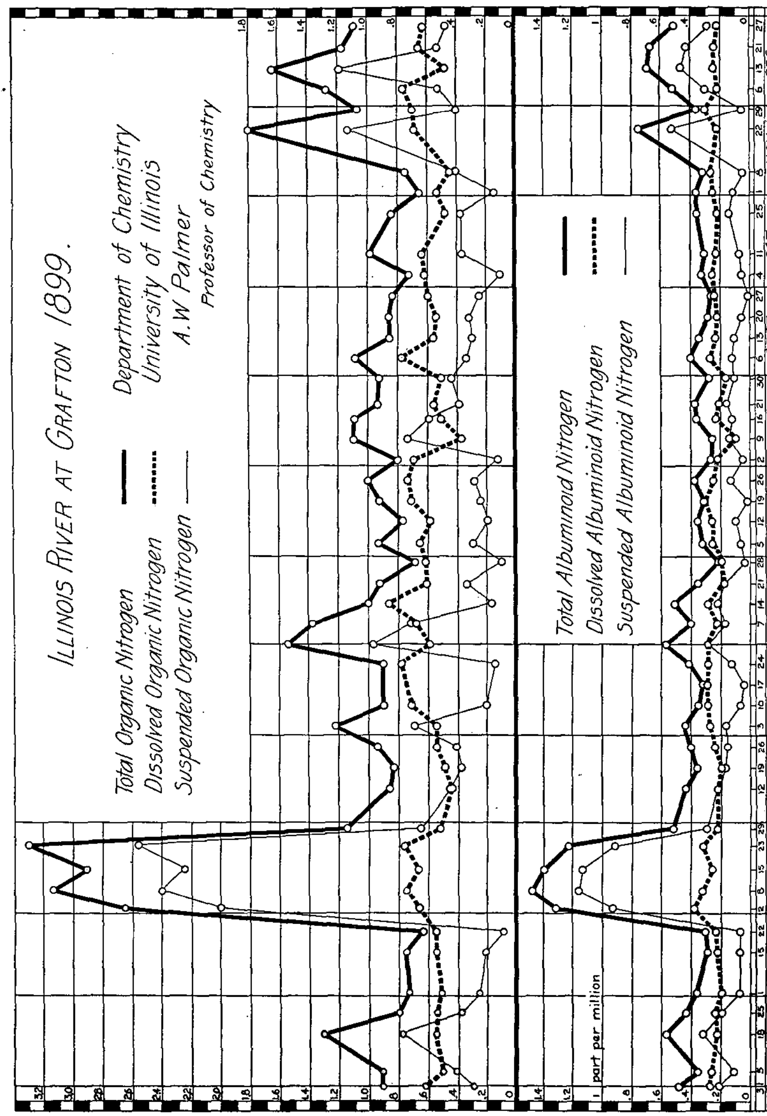
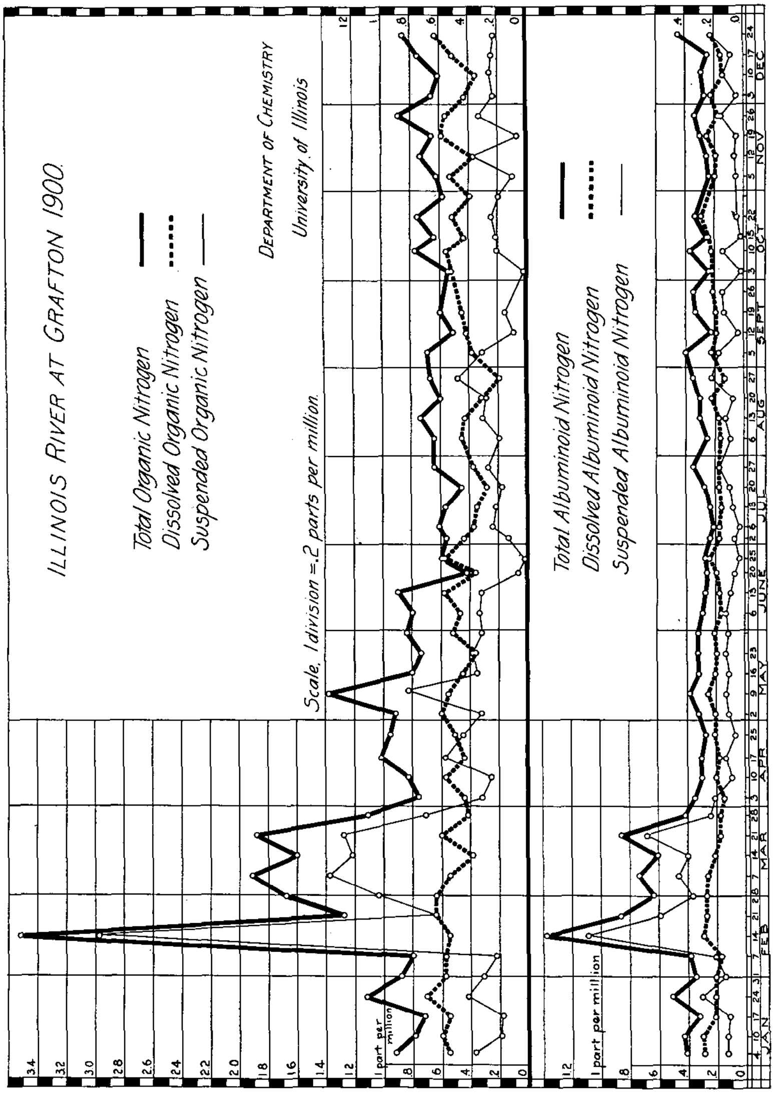

DISCHARGE CURVES, ILLINOIS RIVER
over
KAMPSVILLE DAM
Thirty miles above the point of discharge into the Mississippi River.
One division on scale=5000 cubic feet per second.
Broken line represents uncorrected volumn for times when weir was submerged.
CU. FT. PER SEC. 155000
1902
95000 CU. FT. PER SEC.
CU. FT. PER SEC. 95000
1901
120000 CU. FT. PER SEC.
CU. FT. PER SEC. 120000
1900
JAN. FEB. MAR. APR. MAY JUNE JULY AUG. SEP. OCT. NOV. DEC.

Plate XXI.



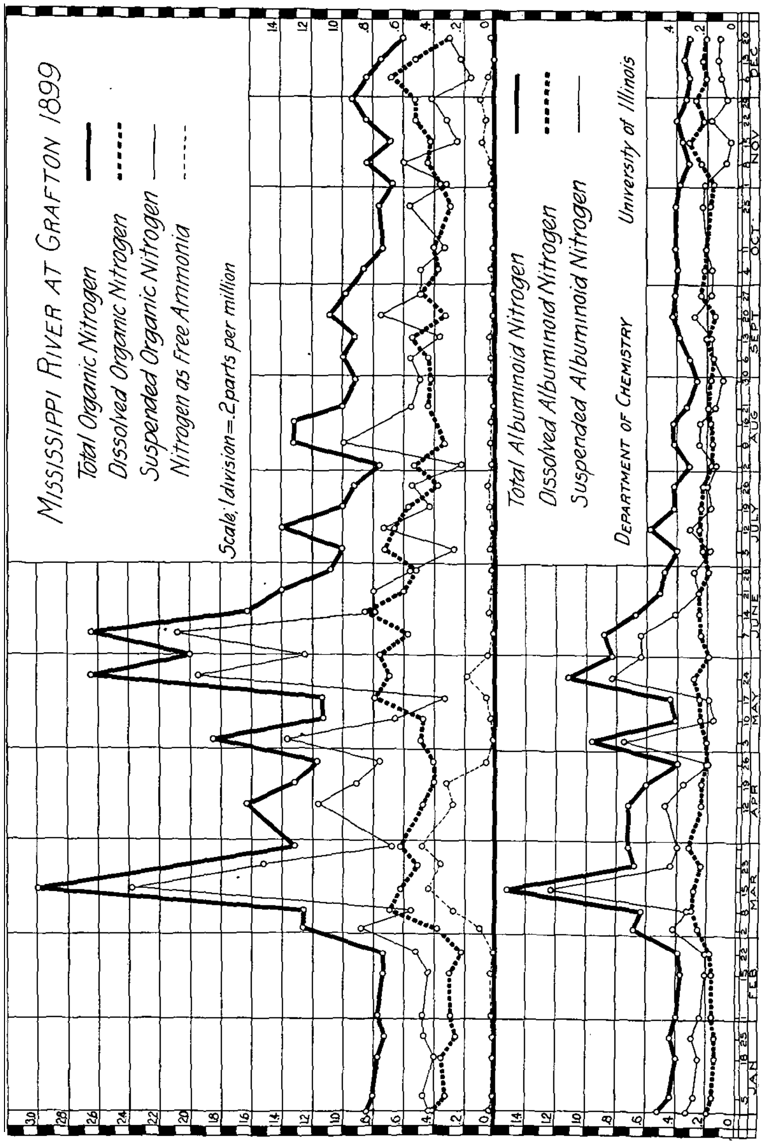
Illinois River at Grafton 1899.
Total Organic Nitrogen
Dissolved Organic Nitrogen
Suspended Organic Nitrogen
Department of Chemistry
University of Illinois
A.W Palmer
Professor of Chemistry
Total Albuminoid Nitrogen
Dissolved Albuminoid Nitrogen
Suspended Albuminoid Nitrogen
1 part per million
DEC JAN FEB MAR APR MAY JUNE JULY AUG SEPT OCT NOV DEC

Plate XXII.



ILLINOIS RIVER AT GRAFTON 1900.
Total Organic Nitrogen
Dissolved Organic Nitrogen
Suspended Organic Nitrogen
DEPARTMENT OF CHEMISTRY
University of Illinois
Scale, 1 division = .2 parts per million.
1 part per million
Total Albuminoid Nitrogen
Dissolved Albuminoid Nitrogen
Suspended Albuminoid Nitrogen
JAN
FEB
MAR
APR
MAY
JUNE
JUL
AUG
SEPT
OCT
NOV
DEC

Plate XXIII.



Mississippi River at Grafton 1899
Total Organic Nitrogen
Dissolved Organic Nitrogen
Suspended Organic Nitrogen
Nitrogen as Free Ammonia
Scale, 1 division = .2 parts per million
Total Albuminoid Nitrogen
Dissolved Albuminoid Nitrogen
Suspended Albuminoid Nitrogen
Department of Chemistry
University of Illinois
JAN
FEB
MAR
APR
MAY
JUNE
JULY
AUG
SEPT
OCT
NOV
DEC

Plate XXIV.

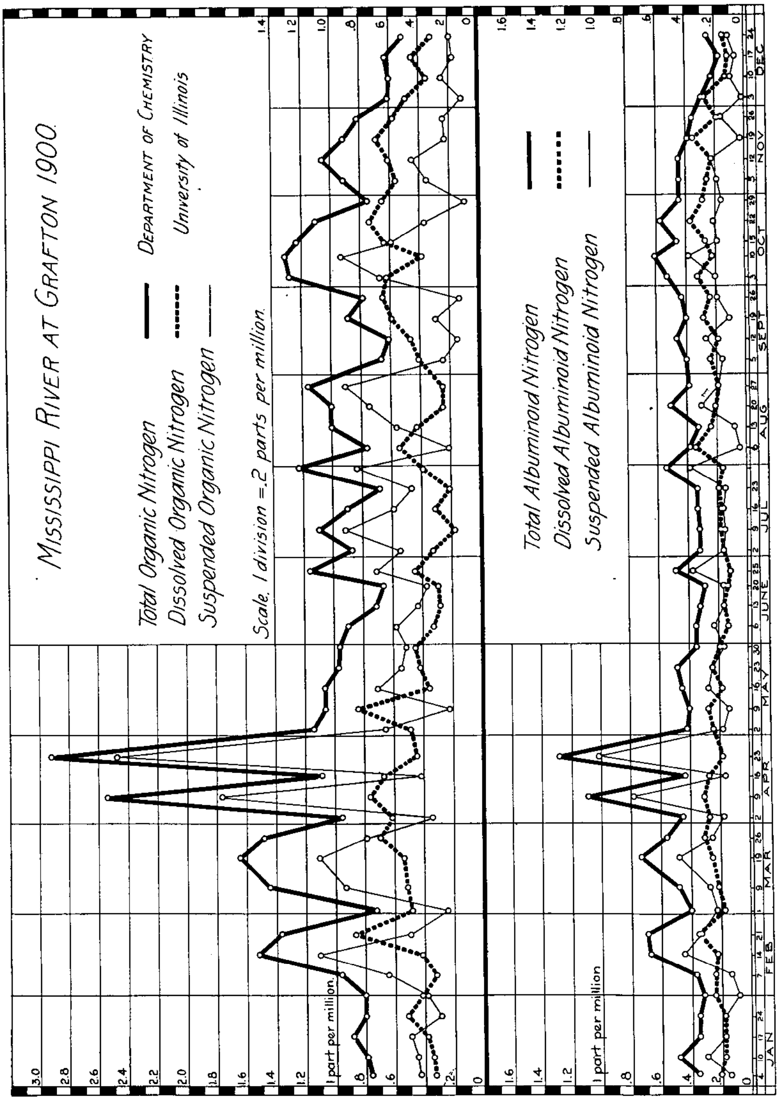

MISSISSIPPI RIVER AT GRAFTON 1900
Total Organic Nitrogen
Dissolved Organic Nitrogen
Suspended Organic Nitrogen
DEPARTMENT OF CHEMISTRY
University of Illinois
Scale. 1 division = .2 parts per million.
1 part per million.
Total Albuminoid Nitrogen
Dissolved Albuminoid Nitrogen
Suspended Albuminoid Nitrogen
1 part per million
JAN
FEB
MAR
APR
MAY
JUNE
JUL
AUG
SEPT
OCT
NOV
DEC

Plate XXV.

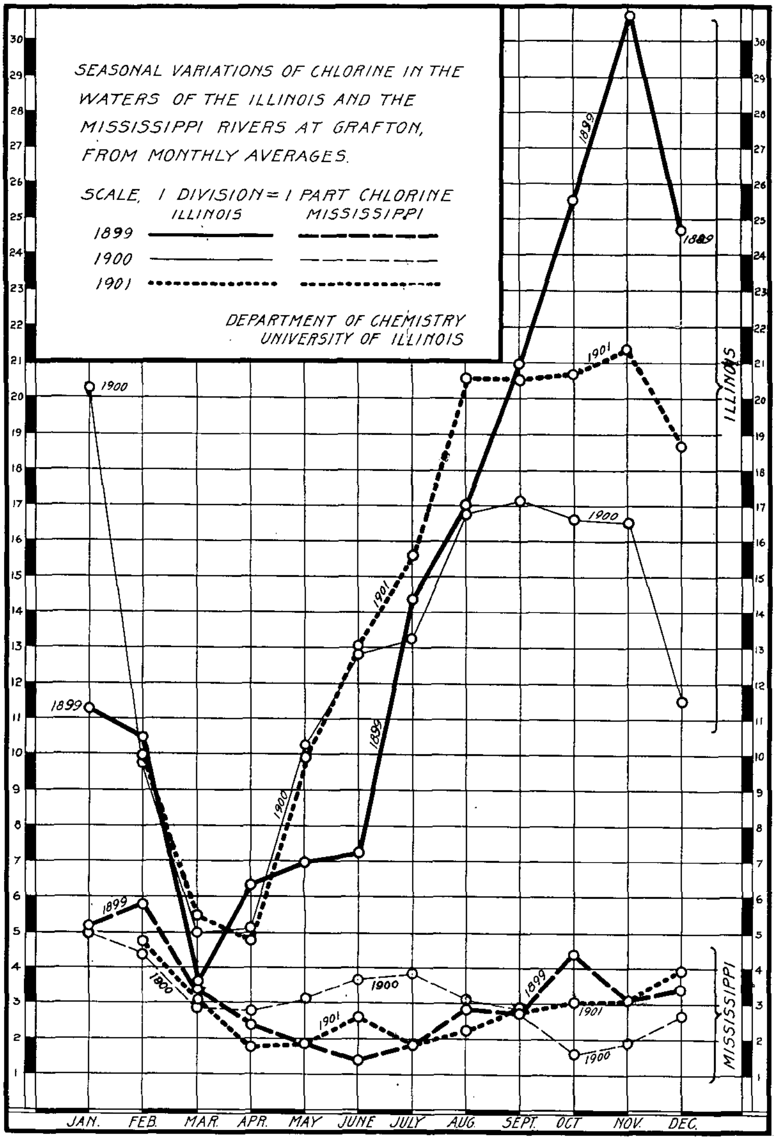

SEASONAL VARIATIONS OF CHLORINE IN THE WATERS OF THE ILLINOIS AND THE MISSISSIPPI RIVERS AT GRAFTON, FROM MONTHLY AVERAGES.
SCALE, 1 DIVISION = 1 PART CHLORINE
ILLINOIS
MISSISSIPPI
1899
1900
1901
DEPARTMENT OF CHEMISTRY
UNIVERSITY OF ILLINOIS
ILLINOIS
MISSISSIPPI
JAN.
FEB.
MAR.
APR.
MAY
JUNE
JULY
AUG.
SEPT.
OCT.
NOV.
DEC.

Plate XXVI.

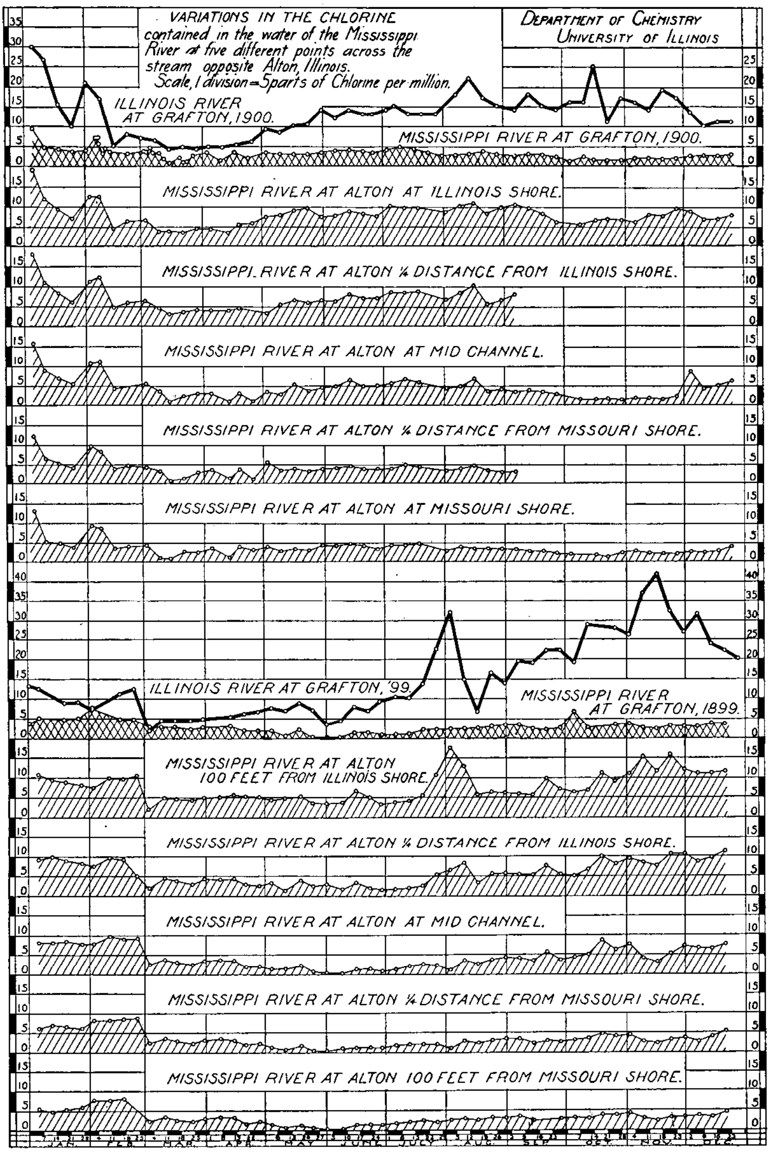

VARIATIONS IN THE CHLORINE contained in the water of the Mississippi River at five different points across the stream opposite Alton, Illinois.
Scale, 1 division = 5 parts of Chlorine per million.
DEPARTMENT OF CHEMISTRY
UNIVERSITY OF ILLINOIS
ILLINOIS RIVER AT GRAFTON, 1900.
MISSISSIPPI RIVER AT GRAFTON, 1900.
MISSISSIPPI RIVER AT ALTON AT ILLINOIS SHORE.
MISSISSIPPI RIVER AT ALTON ¼ DISTANCE FROM ILLINOIS SHORE.
MISSISSIPPI RIVER AT ALTON AT MID CHANNEL.
MISSISSIPPI RIVER AT ALTON ¼ DISTANCE FROM MISSOURI SHORE.
MISSISSIPPI RIVER AT ALTON AT MISSOURI SHORE.
ILLINOIS RIVER AT GRAFTON, '99.
MISSISSIPPI RIVER AT GRAFTON, 1899.
MISSISSIPPI RIVER AT ALTON 100 FEET FROM ILLINOIS SHORE.
MISSISSIPPI RIVER AT ALTON ¼ DISTANCE FROM ILLINOIS SHORE.
MISSISSIPPI RIVER AT ALTON AT MID CHANNEL.
MISSISSIPPI RIVER AT ALTON ¼ DISTANCE FROM MISSOURI SHORE.
MISSISSIPPI RIVER AT ALTON 100 FEET FROM MISSOURI SHORE.

Plate XXVII.

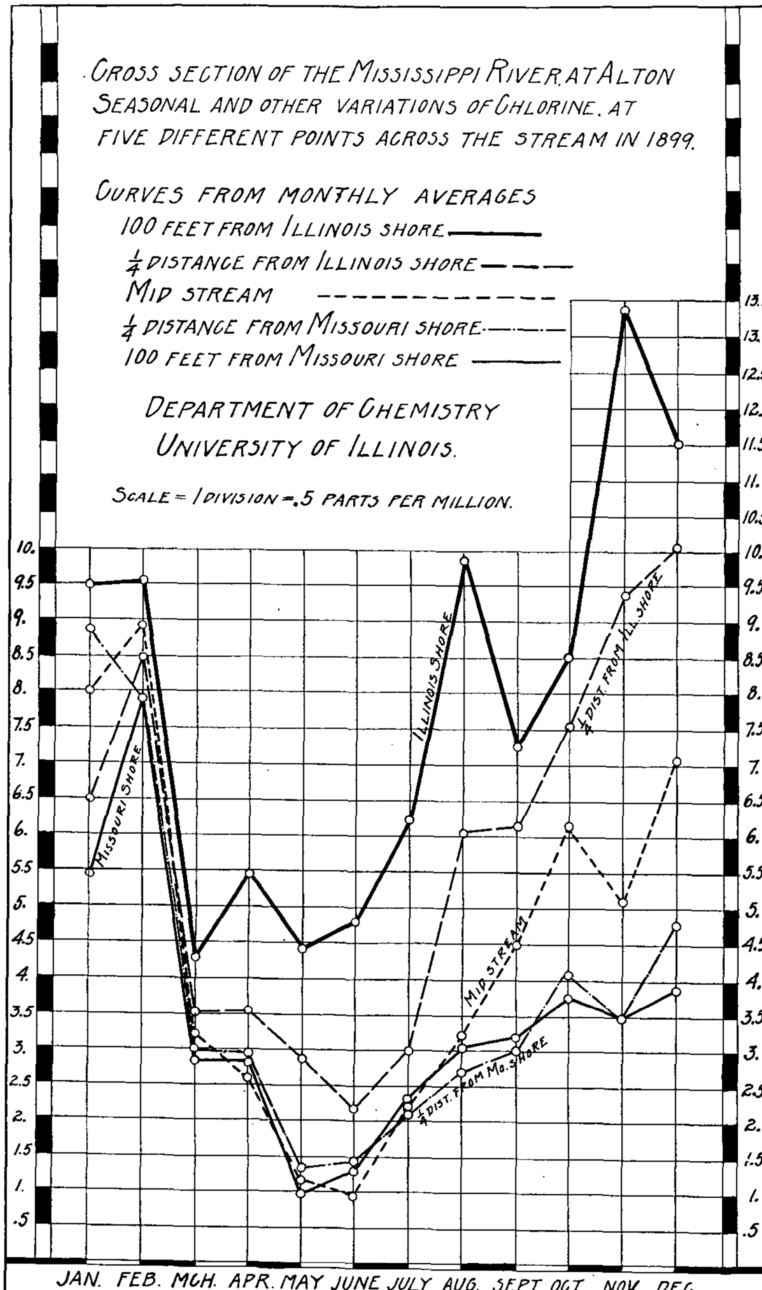

CROSS SECTION OF THE MISSISSIPPI RIVER, AT ALTON
SEASONAL AND OTHER VARIATIONS OF CHLORINE. AT
FIVE DIFFERENT POINTS ACROSS THE STREAM IN 1899.
CURVES FROM MONTHLY AVERAGES
100 FEET FROM ILLINOIS SHORE
1/4 DISTANCE FROM ILLINOIS SHORE
MID STREAM
1/4 DISTANCE FROM MISSOURI SHORE
100 FEET FROM MISSOURI SHORE
DEPARTMENT OF CHEMISTRY
UNIVERSITY OF ILLINOIS.
SCALE = 1 DIVISION = .5 PARTS PER MILLION.
ILLINOIS SHORE
1/4 DIST. FROM ILL. SHORE
MID STREAM
1/4 DIST. FROM MO. SHORE
MISSOURI SHORE
10.
9.5
9.
8.5
8.
7.5
7.
6.5
6.
5.5
5.
4.5
4.
3.5
3.
2.5
2.
1.5
1.
.5
13.5
13.
12.5
12.
11.5
11.
10.5
JAN. FEB. MCH. APR. MAY JUNE JULY AUG. SEPT. OCT. NOV. DEC.

Plate XXVIII.

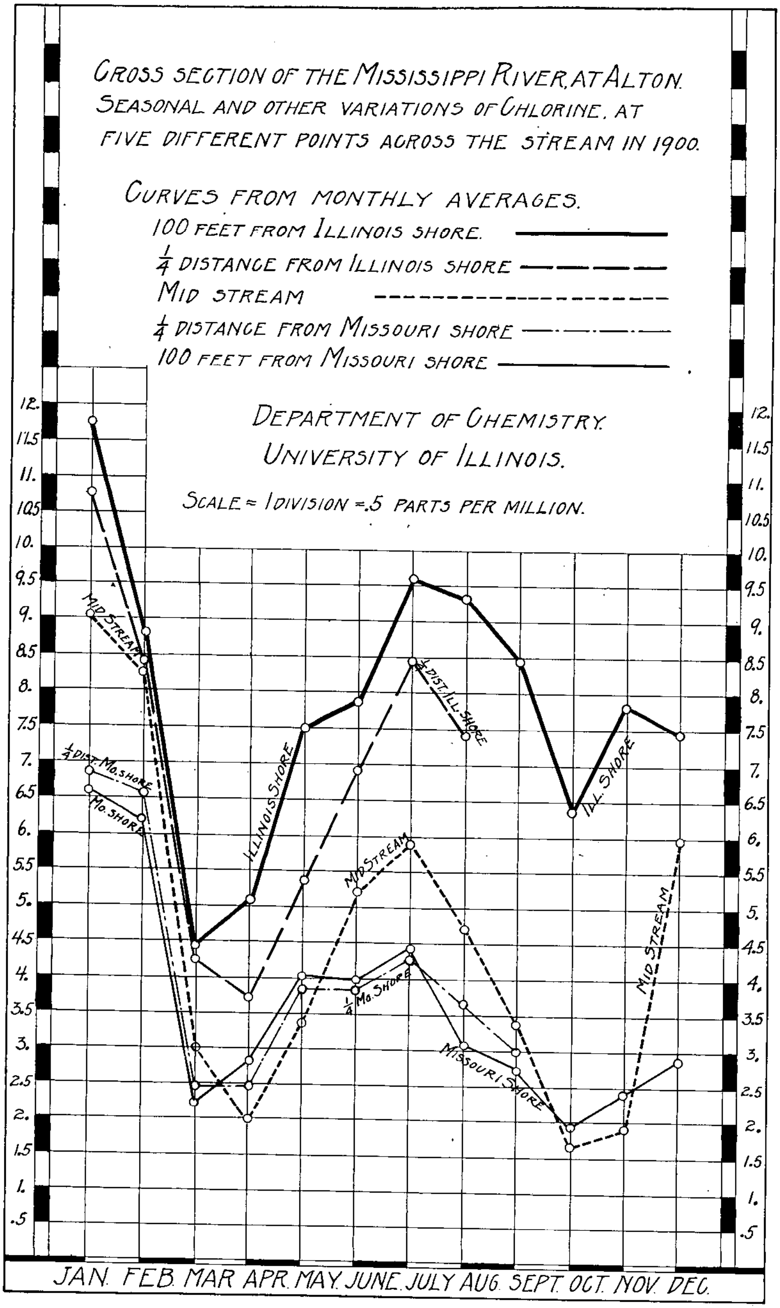
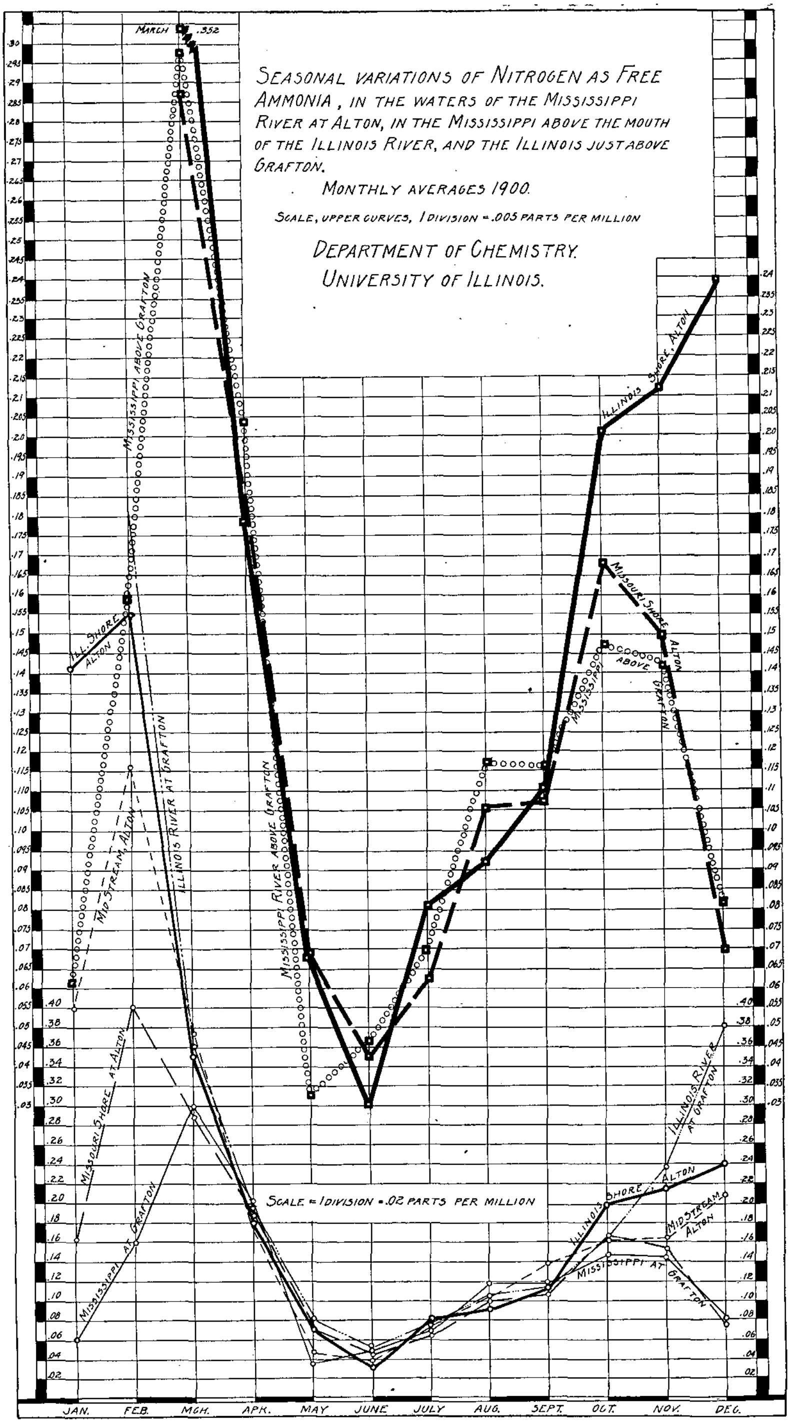


Plate XXIX.



Seasonal variations of Nitrogen as Free Ammonia, in the waters of the Mississippi River at Alton, in the Mississippi above the mouth of the Illinois River, and the Illinois just above Grafton.
Monthly averages 1900.
Scale, upper curves, 1 division = .005 parts per million
Department of Chemistry.
University of Illinois.
Scale = 1 division = .02 parts per million
March .352
Ill. Shore Alton
Mississippi above Grafton
Mid Stream, Alton
Illinois River at Grafton
Mississippi River above Grafton
Illinois Shore, Alton
Missouri Shore Alton
Mississippi above Grafton
Missouri Shore at Alton
Mississippi at Grafton
Illinois River at Grafton
Mid Stream Alton
Jan.
Feb.
Mch.
Apr.
May
June
July
Aug.
Sept.
Oct.
Nov.
Dec.

Plate XXX.

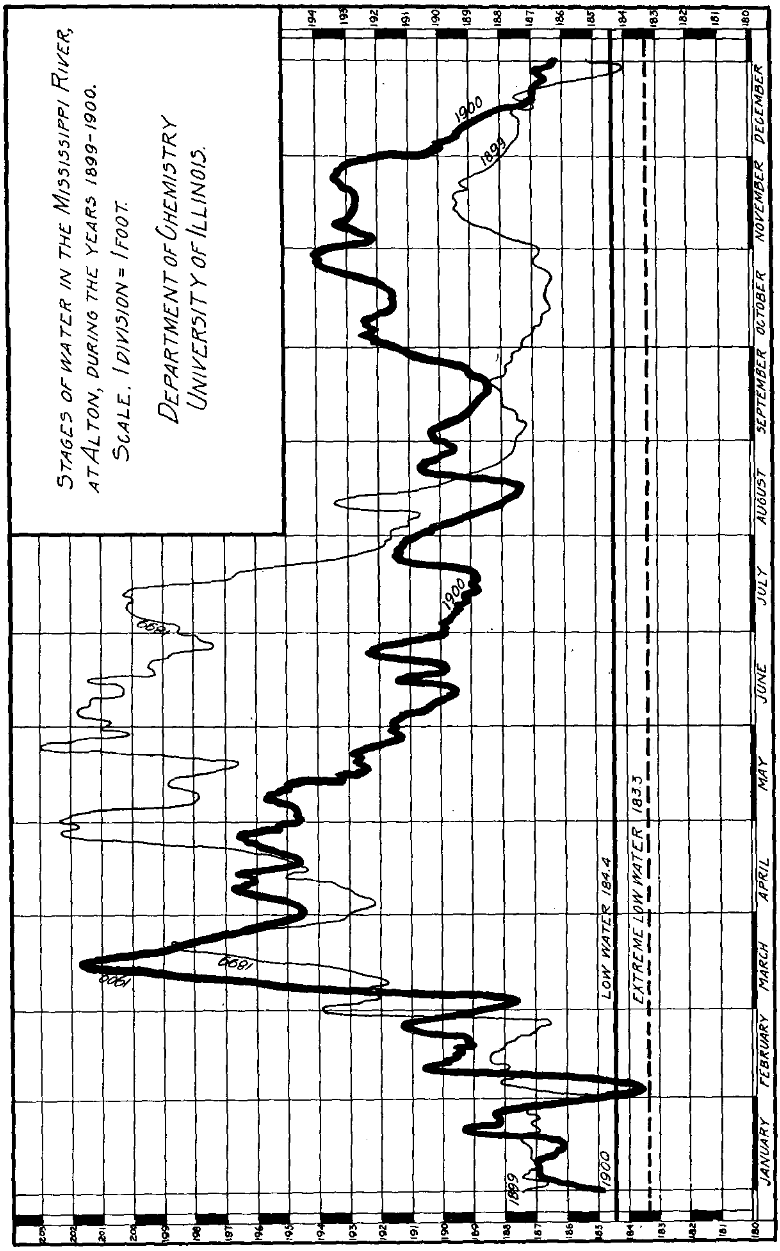
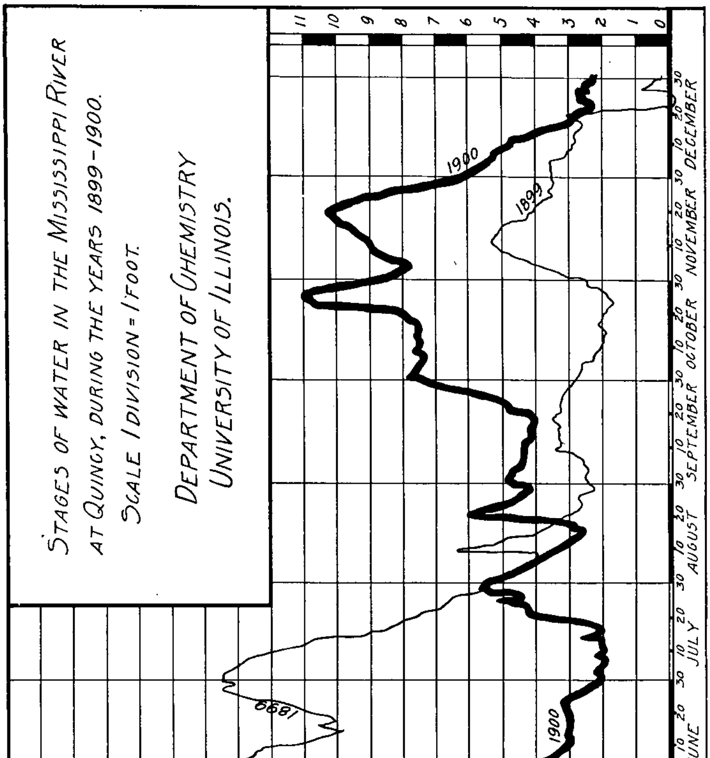
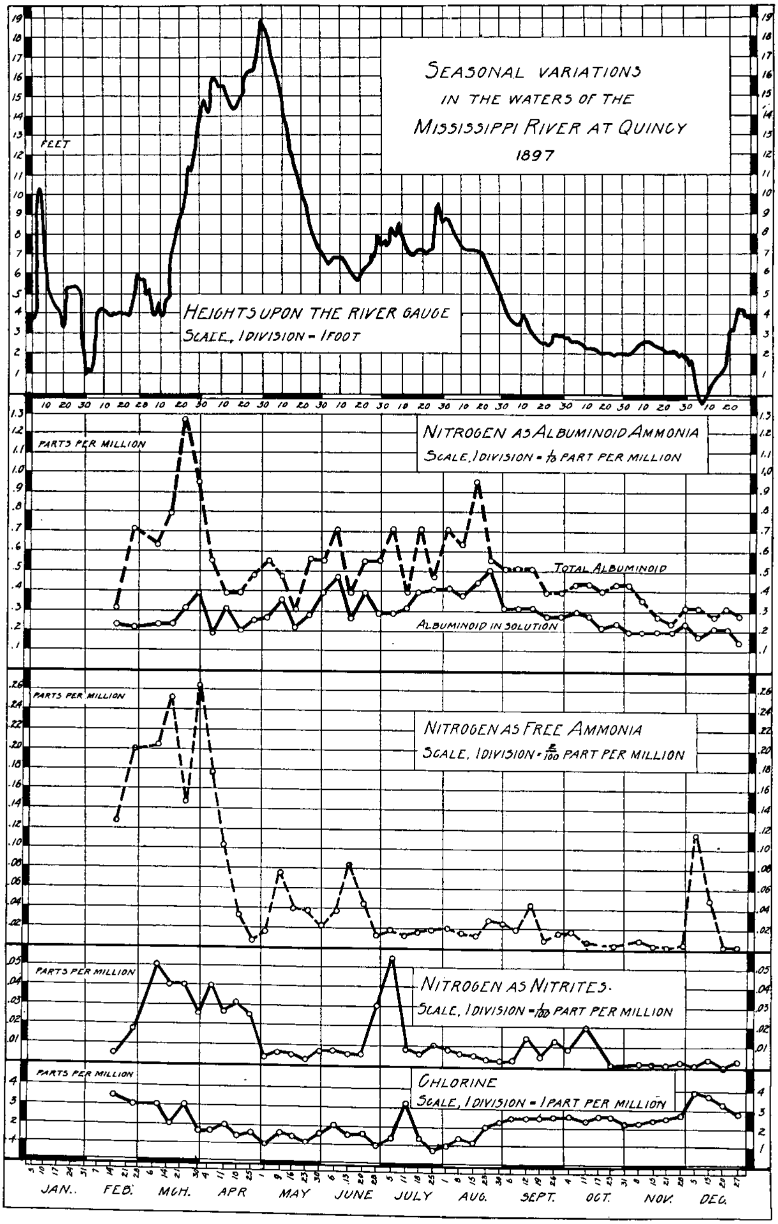

STAGES OF WATER IN THE MISSISSIPPI RIVER,
AT ALTON, DURING THE YEARS 1899-1900.
SCALE. 1 DIVISION = 1 FOOT.
DEPARTMENT OF CHEMISTRY
UNIVERSITY OF ILLINOIS.
JANUARY
FEBRUARY
MARCH
APRIL
MAY
JUNE
JULY
AUGUST
SEPTEMBER
OCTOBER
NOVEMBER
DECEMBER
LOW WATER 184.4
EXTREME LOW WATER 183.3
1899
1900

Plate XXI



STAGES OF WATER IN THE MISSISSIPPI RIVER
AT QUINCY, DURING THE YEARS 1899-1900.
SCALE 1 DIVISION = 1 FOOT.
DEPARTMENT OF CHEMISTRY
UNIVERSITY OF ILLINOIS.
JANUARY FEBRUARY MARCH APRIL MAY JUNE JULY AUGUST SEPTEMBER OCTOBER NOVEMBER DECEMBER
1899
1900

Plate XXXII.



SEASONAL VARIATIONS
IN THE WATERS OF THE
MISSISSIPPI RIVER AT QUINCY
1897
FEET
HEIGHTS UPON THE RIVER GAUGE
SCALE, 1 DIVISION = 1 FOOT
PARTS PER MILLION
NITROGEN AS ALBUMINOID AMMONIA
SCALE, 1 DIVISION = 1/10 PART PER MILLION
TOTAL ALBUMINOID
ALBUMINOID IN SOLUTION
PARTS PER MILLION
NITROGEN AS FREE AMMONIA
SCALE, 1 DIVISION = 2/100 PART PER MILLION
PARTS PER MILLION
NITROGEN AS NITRITES.
SCALE, 1 DIVISION = 1/100 PART PER MILLION
PARTS PER MILLION
CHLORINE
SCALE, 1 DIVISION = 1 PART PER MILLION
JAN. FEB. MCH. APR MAY JUNE JULY AUG. SEPT. OCT. NOV. DEC.

Plate XXXIII.

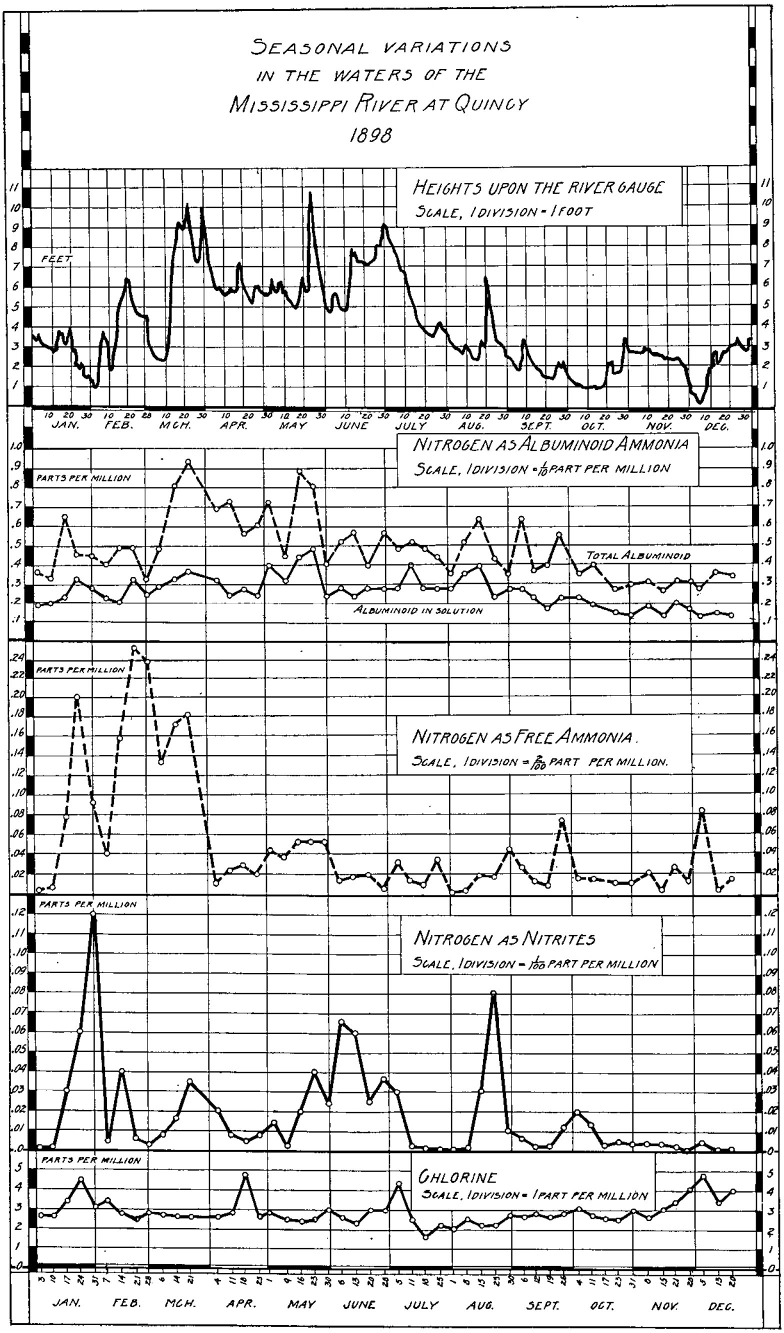
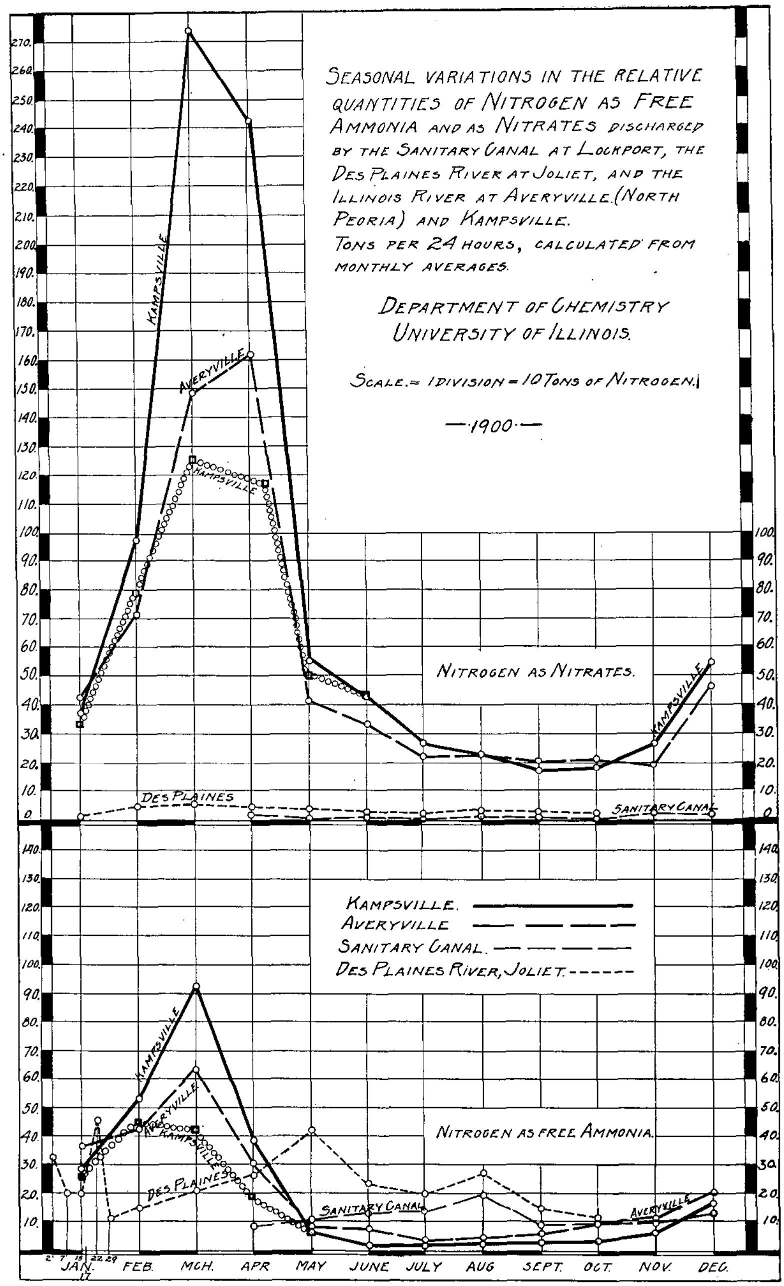


Plate XXXIV.



SEASONAL VARIATIONS IN THE RELATIVE QUANTITIES OF NITROGEN AS FREE AMMONIA AND AS NITRATES DISCHARGED BY THE SANITARY CANAL AT LOCKPORT, THE DES PLAINES RIVER AT JOLIET, AND THE ILLINOIS RIVER AT AVERYVILLE (NORTH PEORIA) AND KAMPSVILLE.
TONS PER 24 HOURS, CALCULATED FROM MONTHLY AVERAGES.
DEPARTMENT OF CHEMISTRY
UNIVERSITY OF ILLINOIS.
SCALE.= 1 DIVISION = 10 TONS OF NITROGEN.
—1900—
NITROGEN AS NITRATES.
NITROGEN AS FREE AMMONIA.
KAMPSVILLE.
AVERYVILLE
SANITARY CANAL.
DES PLAINES RIVER, JOLIET.
KAMPSVILLE
AVERYVILLE
DES PLAINES
SANITARY CANAL
JAN. FEB. MCH. APR MAY JUNE JULY AUG SEPT. OCT. NOV. DEC.

Plate XXXV.

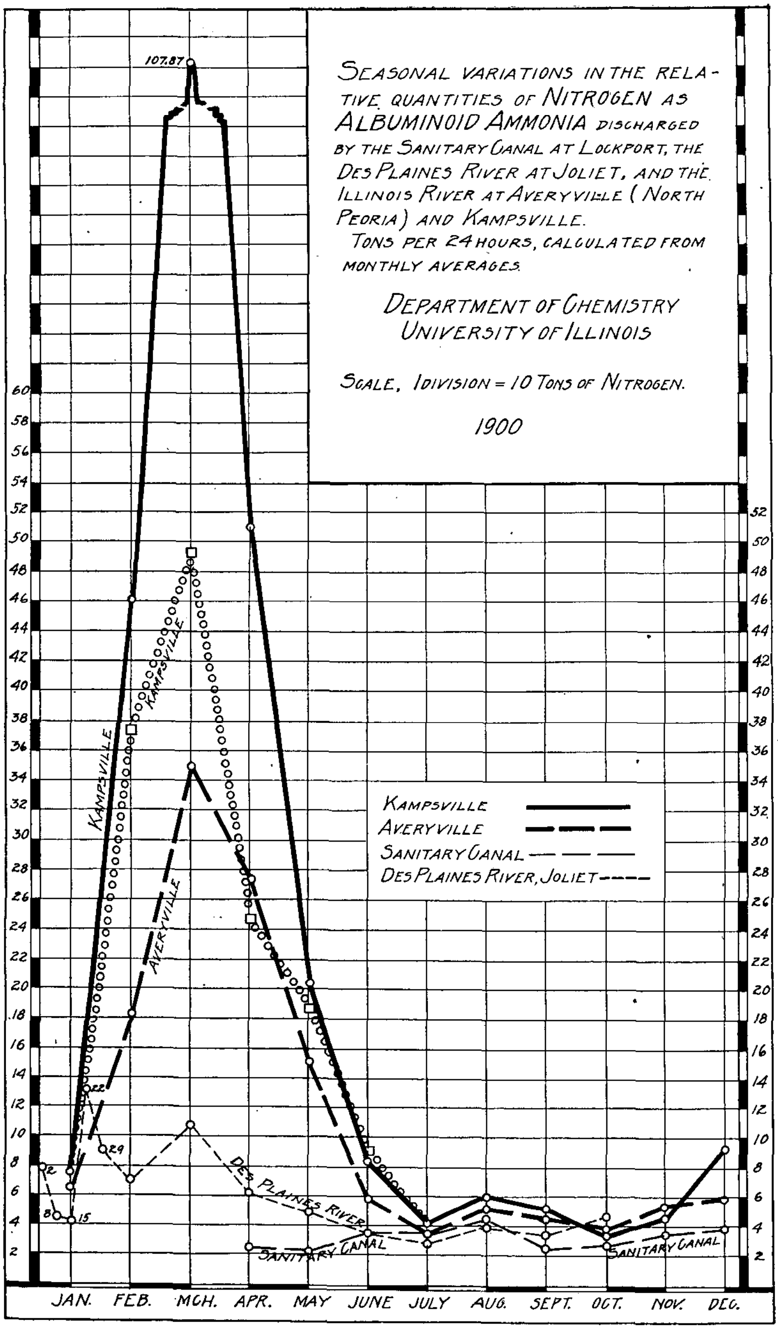
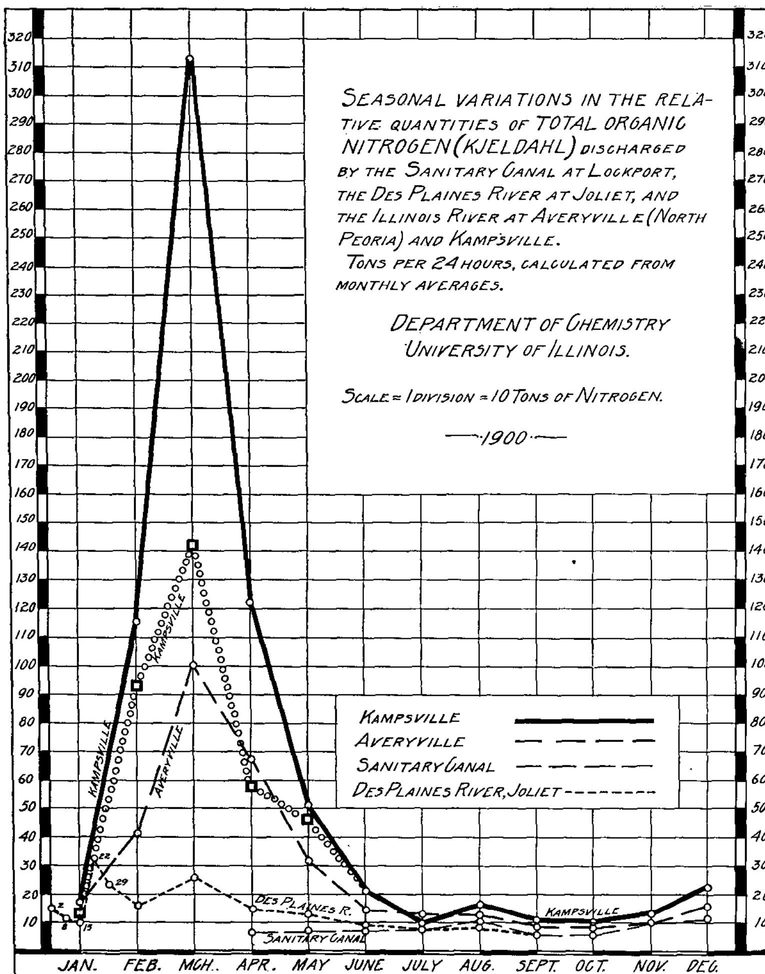
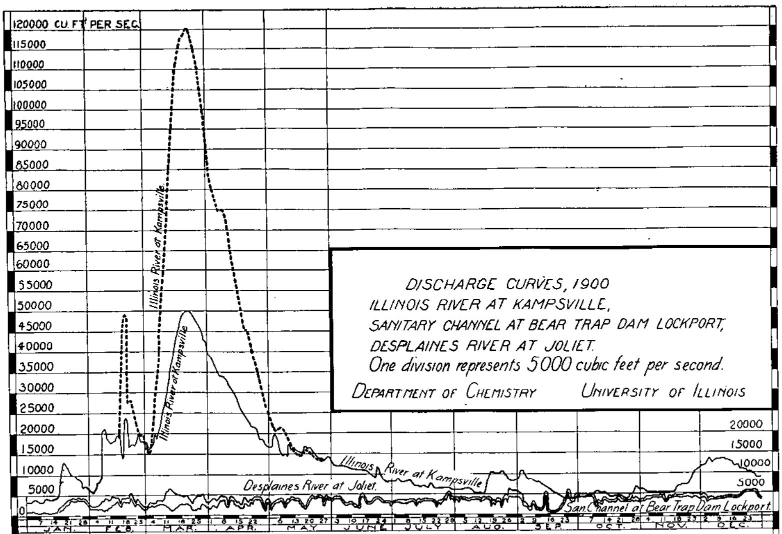

SEASONAL VARIATIONS IN THE RELATIVE QUANTITIES OF NITROGEN AS ALBUMINOID AMMONIA DISCHARGED BY THE SANITARY CANAL AT LOCKPORT, THE DES PLAINES RIVER AT JOLIET, AND THE ILLINOIS RIVER AT AVERYVILLE (NORTH PEORIA) AND KAMPSVILLE.
TONS PER 24 HOURS, CALCULATED FROM MONTHLY AVERAGES.
DEPARTMENT OF CHEMISTRY
UNIVERSITY OF ILLINOIS
SCALE, 1 DIVISION = 10 TONS OF NITROGEN.
1900
KAMPSVILLE
AVERYVILLE
SANITARY CANAL
DES PLAINES RIVER, JOLIET
107.87
DES PLAINES RIVER
SANITARY CANAL
JAN. FEB. MCH. APR. MAY JUNE JULY AUG. SEPT. OCT. NOV. DEC.

Plate XXXVI.



SEASONAL VARIATIONS IN THE RELATIVE QUANTITIES OF TOTAL ORGANIC NITROGEN (KJELDAHL) DISCHARGED BY THE SANITARY CANAL AT LOCKPORT, THE DES PLAINES RIVER AT JOLIET, AND THE ILLINOIS RIVER AT AVERYVILLE (NORTH PEORIA) AND KAMPSVILLE.
TONS PER 24 HOURS, CALCULATED FROM MONTHLY AVERAGES.
DEPARTMENT OF CHEMISTRY
UNIVERSITY OF ILLINOIS.
SCALE = 1 DIVISION = 10 TONS OF NITROGEN.
1900
KAMPSVILLE
AVERYVILLE
SANITARY CANAL
DES PLAINES RIVER, JOLIET
DES PLAINES R.
SANITARY CANAL
KAMPSVILLE
JAN. FEB. MCH. APR. MAY JUNE JULY AUG. SEPT. OCT. NOV. DEC.

Plate XXXVII.



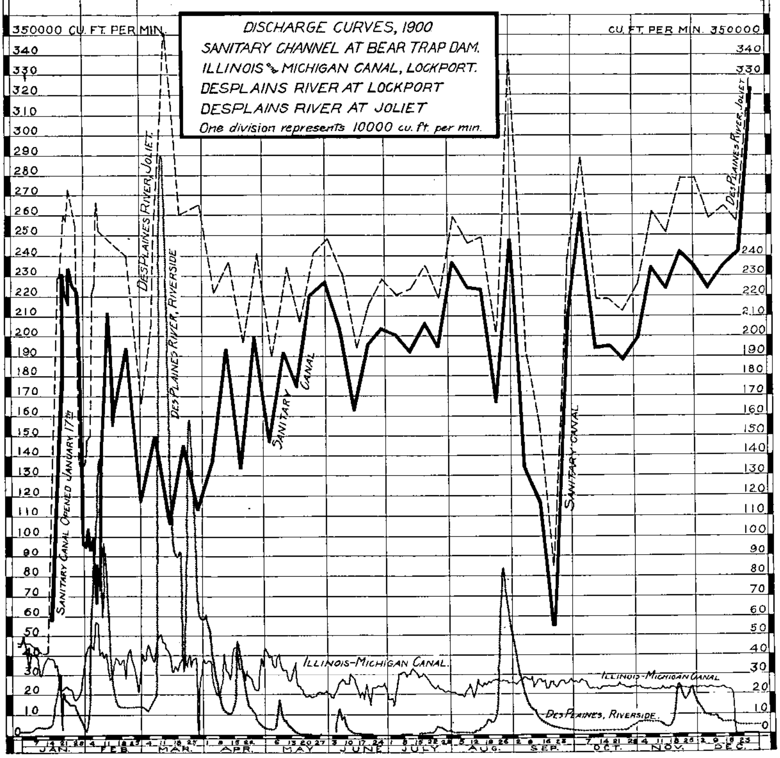


Plate XXXVIII.

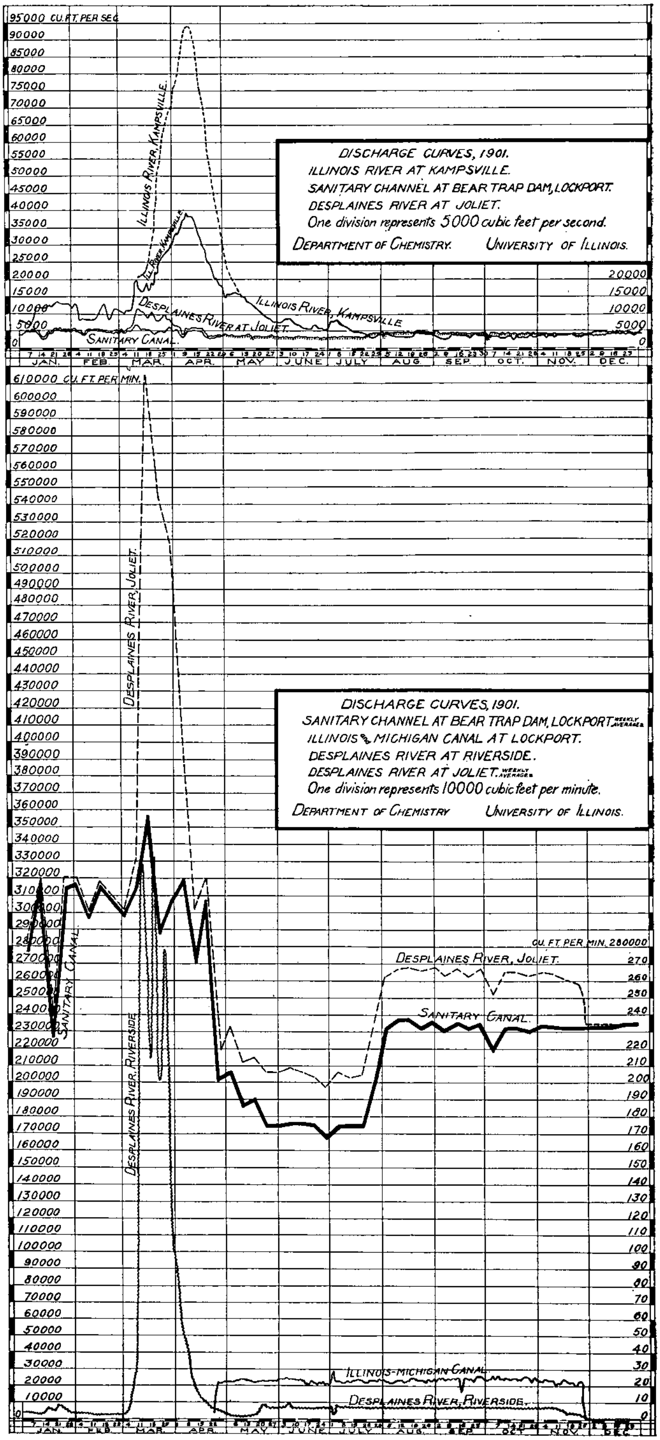


Plate XXXIX.

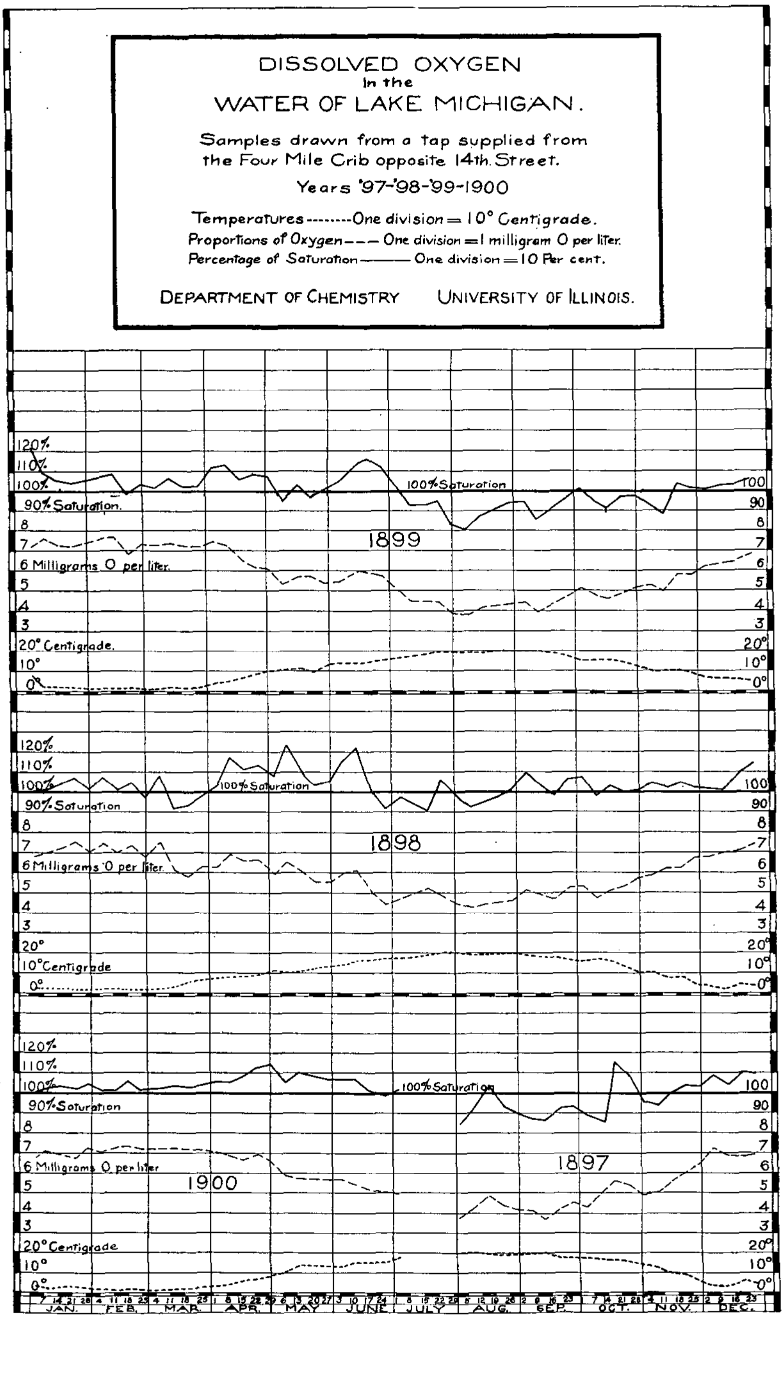

DISSOLVED OXYGEN
in the
WATER OF LAKE MICHIGAN.
Samples drawn from a tap supplied from
the Four Mile Crib opposite 14th. Street.
Years '97-'98-'99-1900
Temperatures --------One division = 10° Centigrade.
Proportions of Oxygen ——— One division = 1 milligram O per liter.
Percentage of Saturation ——— One division = 10 Per cent.
DEPARTMENT OF CHEMISTRY
UNIVERSITY OF ILLINOIS.
1899
1898
1900
1897
120%
110%
100%
100% Saturation
90% Saturation.
6 Milligrams O per liter.
20° Centigrade.
10° Centigrade
0°
JAN.
FEB.
MAR.
APR.
MAY
JUNE
JULY
AUG.
SEP.
OCT.
NOV.
DEC.

Plate XL.

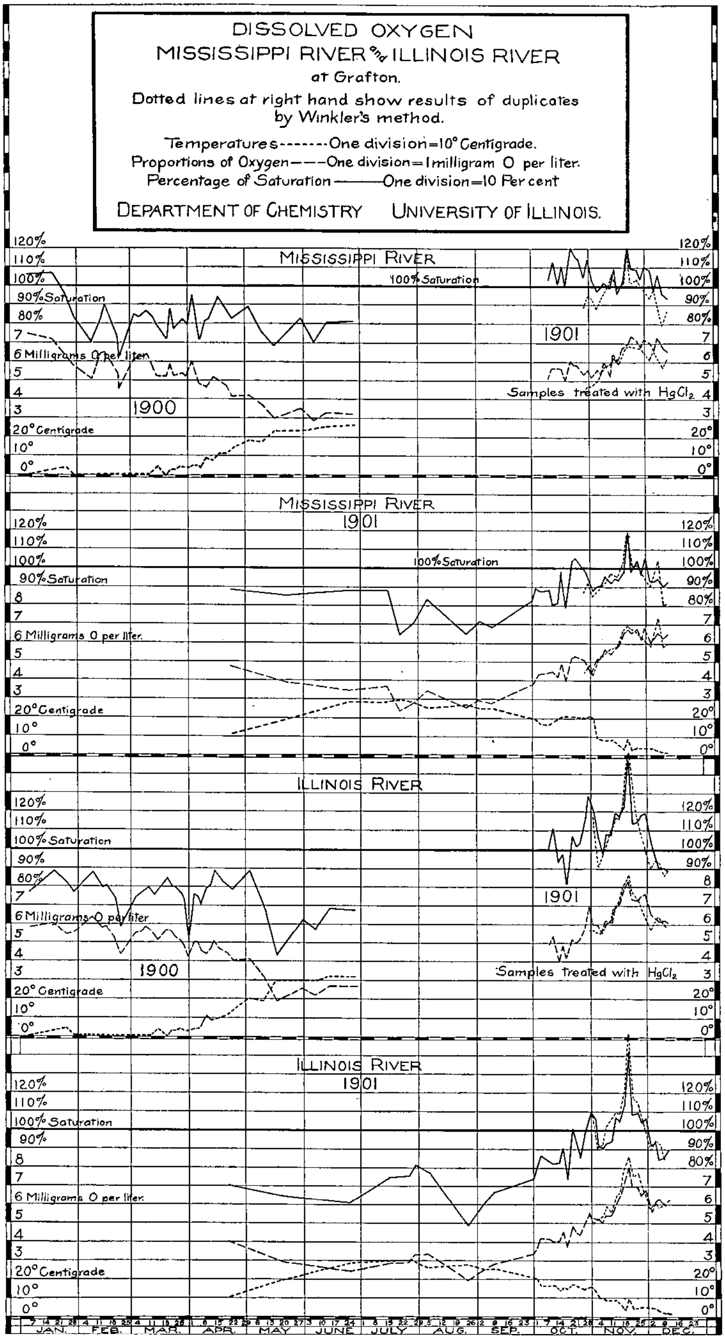

DISSOLVED OXYGEN
MISSISSIPPI RIVER and ILLINOIS RIVER
at Grafton.
Dotted lines at right hand show results of duplicates by Winkler's method.
Temperatures-------One division=10° Centigrade.
Proportions of Oxygen---One division=1 milligram O per liter.
Percentage of Saturation———One division=10 Per cent
DEPARTMENT OF CHEMISTRY
UNIVERSITY OF ILLINOIS.
MISSISSIPPI RIVER
1900
1901
100% Saturation
90% Saturation
6 Milligrams O per liter.
20° Centigrade
Samples treated with $HgCl_2$
MISSISSIPPI RIVER
1901
ILLINOIS RIVER
1900
1901
ILLINOIS RIVER
1901
JAN. FEB. MAR. APR. MAY JUNE JULY AUG. SEP. OCT. NOV. DEC.

Plate XLI.

Commingling of Illinois and Mississippi.

Cross section of the Mississippi River at Alton showing the relative proportions of upper Mississippi River water and Illinois River water at five different points across the stream. Calculated from the average contents of chlorine at the five points, as determined from weekly analyses throughout the respective years. See tables pages 172-191

The location is sixteen miles below the mouth of the Illinois River and seven miles above the mouth of the Missouri River.

Department of Chemistry
University of Illinois

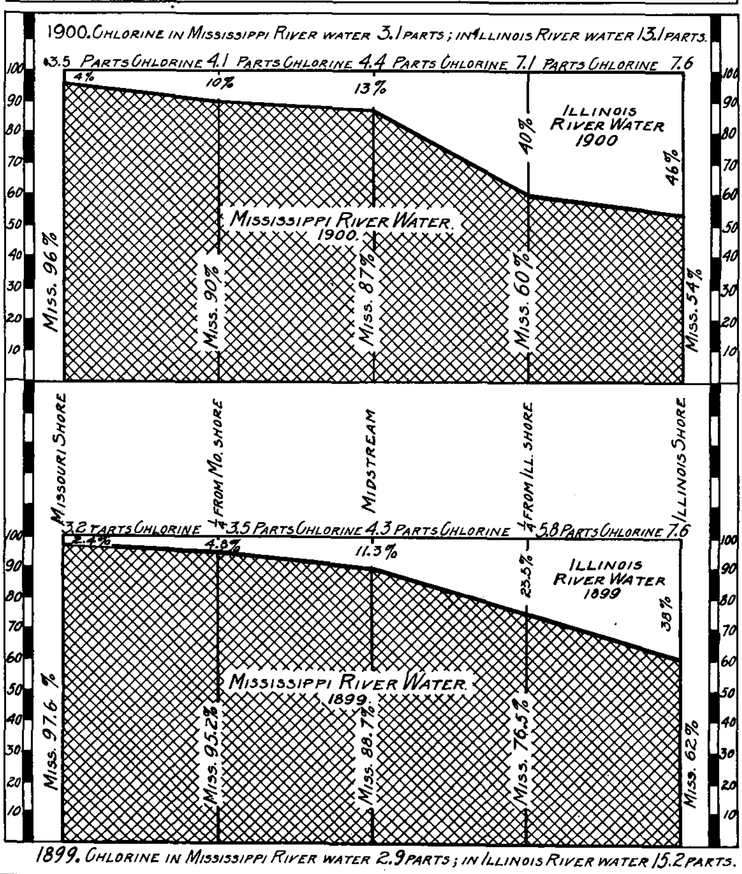
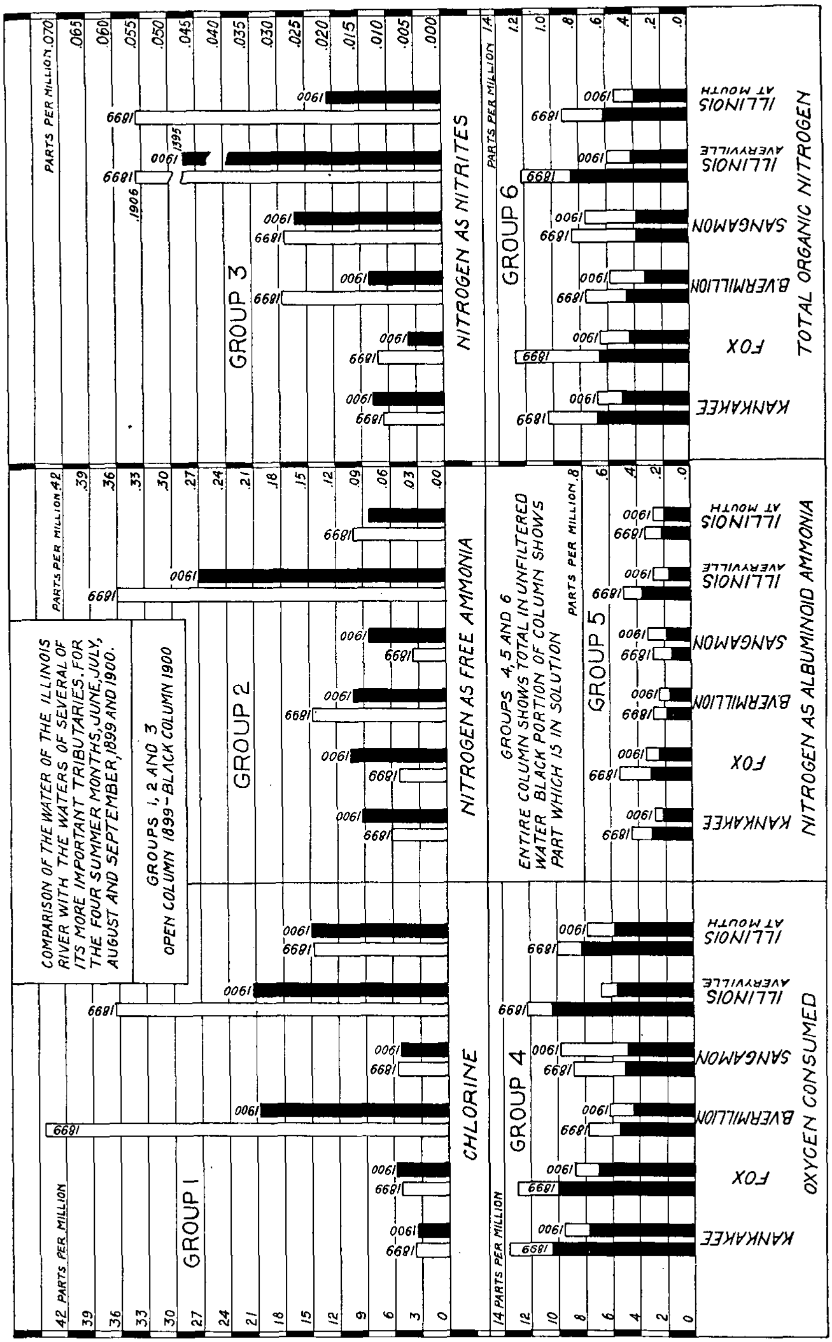
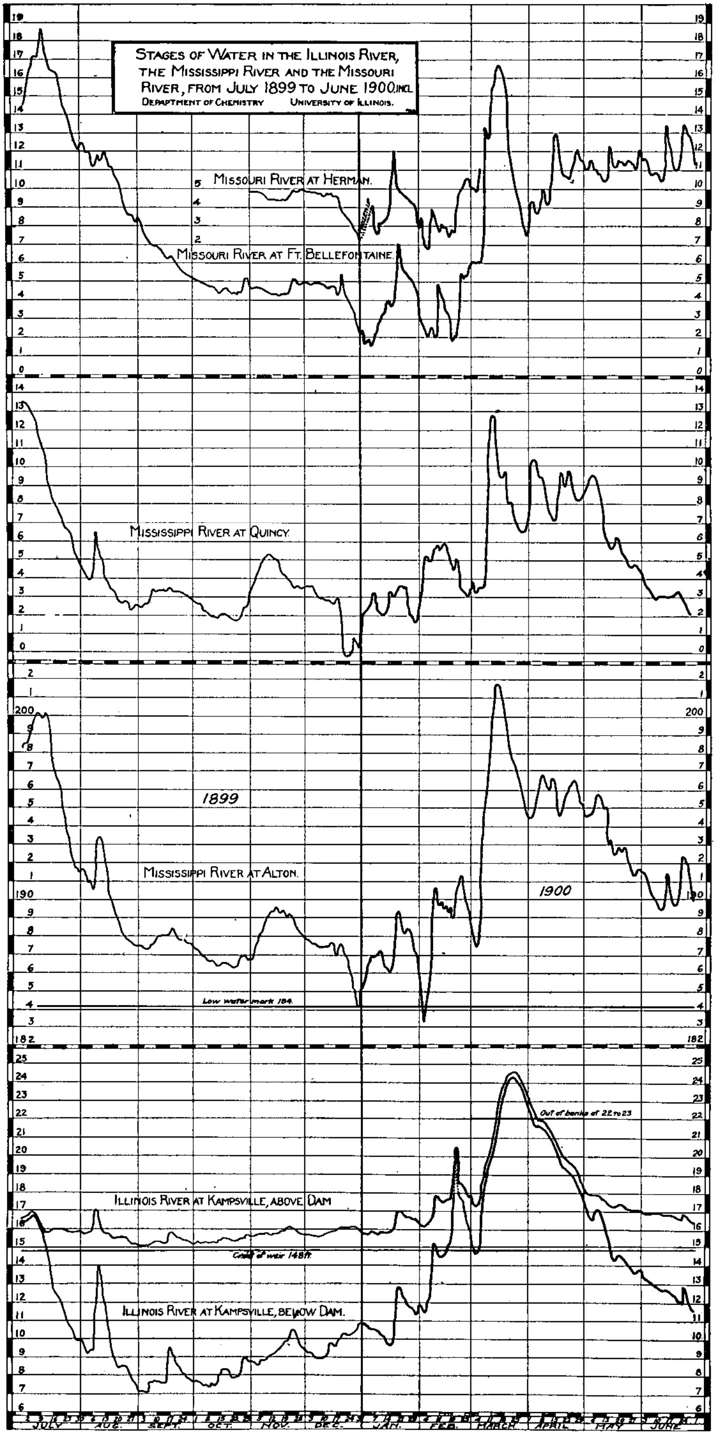
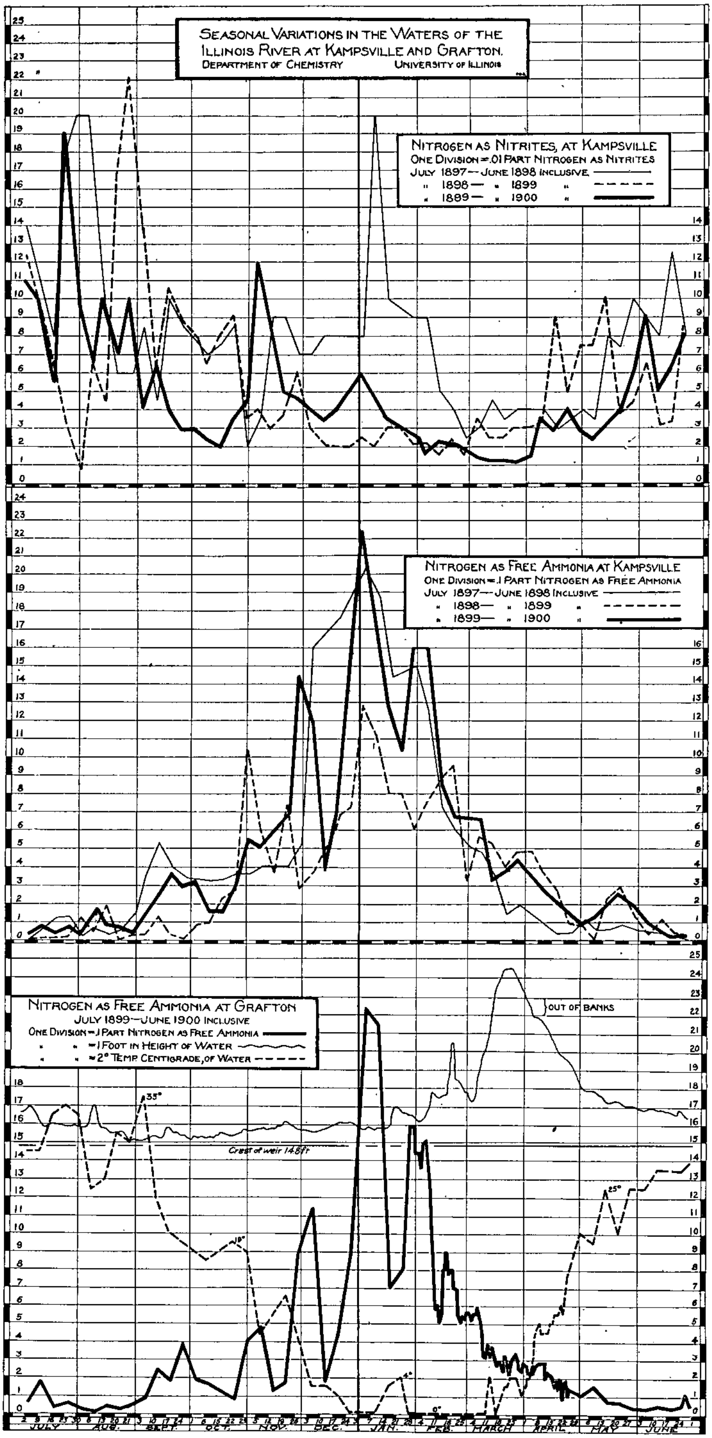


Plate XLII.


COMPARISON OF THE WATER OF THE ILLINOIS RIVER WITH THE WATERS OF SEVERAL OF ITS MORE IMPORTANT TRIBUTARIES, FOR THE FOUR SUMMER MONTHS, JUNE, JULY, AUGUST AND SEPTEMBER, 1899 AND 1900.
GROUPS 1, 2 AND 3
OPEN COLUMN 1899-BLACK COLUMN 1900
GROUPS 4, 5 AND 6
ENTIRE COLUMN SHOWS TOTAL IN UNFILTERED WATER. BLACK PORTION OF COLUMN SHOWS PART WHICH IS IN SOLUTION
GROUP 1
GROUP 2
GROUP 3
GROUP 4
GROUP 5
GROUP 6
CHLORINE
NITROGEN AS FREE AMMONIA
NITROGEN AS NITRITES
OXYGEN CONSUMED
NITROGEN AS ALBUMINOID AMMONIA
TOTAL ORGANIC NITROGEN
KANKAKEE
FOX
V.VERMILLION
SANGAMON
ILLINOIS AVERYVILLE
ILLINOIS AT MOUTH
PARTS PER MILLION


STAGES OF WATER IN THE ILLINOIS RIVER, THE MISSISSIPPI RIVER AND THE MISSOURI RIVER, FROM JULY 1899 TO JUNE 1900 INCL.
DEPARTMENT OF CHEMISTRY UNIVERSITY OF ILLINOIS.
MISSOURI RIVER AT HERMAN.
MISSOURI RIVER AT FT. BELLEFONTAINE.
MISSISSIPPI RIVER AT QUINCY.
1899
MISSISSIPPI RIVER AT ALTON.
1900
Low water mark 184.
Out of banks at 22 to 23
ILLINOIS RIVER AT KAMPSVILLE, ABOVE DAM
Crest of weir 148 ft.
ILLINOIS RIVER AT KAMPSVILLE, BELOW DAM.
JULY
AUG.
SEPT.
OCT.
NOV.
DEC.
JAN.
FEB.
MARCH
APRIL
MAY
JUNE



Seasonal Variations in the Waters of the Illinois River at Kampsville and Grafton.
Department of Chemistry
University of Illinois
Nitrogen as Nitrites, at Kampsville
One Division = .01 Part Nitrogen as Nitrites
July 1897 — June 1898 Inclusive
" 1898 — " 1899 "
" 1899 — " 1900 "
Nitrogen as Free Ammonia at Kampsville
One Division = .1 Part Nitrogen as Free Ammonia
July 1897 — June 1898 Inclusive
" 1898 — " 1899 "
" 1899 — " 1900 "
Nitrogen as Free Ammonia at Grafton
July 1899 — June 1900 Inclusive
One Division = .1 Part Nitrogen as Free Ammonia
" " = 1 Foot in Height of Water
" " = 2° Temp. Centigrade, of Water
35°
Crest of weir 14.8 ft
Out of banks
25°
July
Aug.
Sept.
Oct.
Nov.
Dec.
Jan.
Feb.
March
April
May
June

TABLES OF ANALYSES.

The following tables, running from page 102 to 240 inclusive, comprise most of the results of the analyses of the waters of the Illinois river and its tributaries which we have made during the period 1897-1902 inclusive.

Chemical Examination of Water from the Illinois and Michigan Canal at Lockport.
(Parts per 1,000,000.)

Serial Number.	1897. Date of Collection.	1897. Date of Examination.	Appearance. Turbidity.	Appearance. Sediment.	Appearance. Color.	Residue on Evaporation. Total.	Residue on Evaporation. Dissolved.	Residue on Evaporation. Suspended.	Loss on Ignition. Total.	Loss on Ignition. Dissolved	Chlorine.	Oxygen Consumed. Total.	Oxygen Consumed. By Dissolved.	Oxygen Consumed. By Suspended Matt'r	Nitrogen as Ammonia. Free Ammonia.	Albuminoid Ammonia. Total.	Albuminoid Ammonia. Dissolved	Albuminoid Ammonia. Suspended	Organic Nitrogen. Total.	Organic Nitrogen. Dissolved	Organic Nitrogen. Suspended	Nitrogen as Nitrites.	Nitrogen as Nitrates.
1798	Jan. 4	Jan. 5	vd	m	1.	538.	320.4	217.6	26.	16.	59.	25.3	14.5	10.8	2	1.6	.8	.8	2.24	1.28	.96	.13	4.2
1816	" 11	" 13	d	c	.4	568.4	516.8	51.6	48.	37.6	85.	25.8	17.5	8.3	4.4	1.76	1.28	.48	4.	2.4	1.6	.5	1.5
1843	" 18	" 21	d	c	.3	502.	384.4	117.6	32.	16.	71.	28.6	14.4	14.2	8.	1.92	.96	.96	3.52	1.52	2.	.8	.7
1850	" 25	" 8	d	l	.2	586.4	549.2	37.2	26.	22.8	94.	34.	17.3	16.7	9.2	3.2	1.76	1.44	6.	3.68	.32	.006	.15
1873	Feb. 1	Feb. 3	vd	m	.06	1698.4	1269.2	429.2	52.	24.	505.	68.	12.8	55.2	7.2	5.6	.8	4..8	9.6	1.28	8.32	.07	.2
1897	" 9	" 10	d	m	.3	1202.8	621.6	581.2	116.	24.	151.	88.8	17.4	71.4	13.6	10.8	1.12	9.68	19.2	3.2	16.	.032	.25
1915	" 15	" 16	d	c	.5	715.2	656.	59.2	56.8	37.	170.	45.5	19.1	26.4	16.	4.	2.08	1.92	8.	2.72	5.28	.026	.2
1936	" 22	" 24	d	c	.4	689.6	023.6	66.	131.6	96.8	142.	37.5	17.3	20.2	11.2	3.52	1.76	1.76	6.8	1.92	4.88	.051	.2
1956	Mar. 1	Mar. 2	d	c	.4	624.	573.2	59.8	126.8	94.	146.	37.1	18.1	19.	8.	3.84	1.28	2.56	7.55	1.71	5.84	.03	.075
1974	" 8	" 9	d	c	.2	559.2	501.2	68.	126.	78.8	107.	44.	18.8	25.2	0.	4.	1.92	2.08	6.75	1.71	5.04	none	.1
2008	" 15	" 16	d	c	.2	615.2	541.6	73.6	121.2	98.4	100.	39.3	17.3	22.	8.	3.2	1.28	1.92	6.67	1.71	4.96	.02	.2
2033	" 22	" 23	d	m	.1	677.2	470.4	206.8	96.4	61.2	70.	26.9	13.3	13.6	4.	1.92	.8	1.12	3.5	1.23	2.27	.575	.65
2056	" 29	" 30	d	c	.1	537.2	498.	39.2	92.	88.4	70.	26.	14.3	11.7	3.6	2.08	.72	1.36	3.32	1.	2.32	.017	.3
2087	Apr. 5	Apr. 6	d	m	.5	677.3	553.2	124.	118.	54.4	95.	47.7	19.1	28.6	8.	3.68	1.12	2.56	6.03	1.47	4.56	.03	.3
2116	" 13	" 14	d	c	.5	583.2	503.2	80.	96.	62.	91.	42.6	19.1	23 5	9.6	3.04	1.44	.6	5.07	2.27	2.8	none	.15
2131	" 19	" 20	vd	m	.6	725.2	630.4	94.8	117.2	66.4	137.	48 3	24.3	24.	15.6	3.04	1.76	1.28	5.23	3.4	1.83	.002	.15
2159	" 26	" 28	d	m	.5	698.8	609.2	89.6	110.	78.8	129.	45.7	22.6	23.1	14.4	3.2	1.6	1.6	5.51	3.27	3.24	.005	.25
2181	May 3	May 4	d	m	.5	591.2	502.	89.2	58.	47.2	73.	43.2	21.4	21.8	8.	2.56	1.44	1.12	4.87	2.47	2.4	.04	.15
2207	" 10	" 12	d	m	.4	599.2	512.2	87.	60.	43.2	90.	45.2	23.1	22.1	10.4	2.8	1.6	1.2	5.11	2.63	2.48	.04	.15
2223	" 17	" 18	d	c	.5	530.8	451.6	79.2	78.	60.	80.	44.	20.4	23.6	9.6	2.8	1.12	1.68	4.75	2.03	2.72	.045	.1
2263	" 24	" 26	d	m	.5	588.	509.2	78.8	76.	60.	123.	40.5	19.	21.5	16.8	2.08	1.44	.64	4.35	2.03	2.32	.016	.35
2283	" 31	June 2	vd	c	.4	514.8	424.4	90.4	70.8	42.8	91.	41.7	16.5	25.2	1.2	2.4	1.44	.96	4.35	2.51	1.84	.023	.1
2300	June 7	" 8	d	m	.4	537.2	484.4	52.8	59.2	48.8	119.	39.4	20..	19.4	16.8	3.6	1.76	1.84	3.93	2.33	1.6	.045	.1
2322	" 14	" 15	d	m	.3	813.6	444.8	368.8	134.	34.	109.	58.3	20.3	38.	16.	3.6	.8	2.8	6.73	1.7	5.03	.04	.15
2369	" 22	" 24	vd	m	.5	670.	590.8	79.2	44.	36..	139.	41.2	23.9	17.3	20	1.9	.96	.96	3.61	2.01	1.6	.018	.2
2396	" 29	July 1	d	m	....	734.8	509.2	225.6	118.	53.2	120.	32.2	16.8	15.4	16.	2.08	1.04	1.04	3.93	1.85	2.08	.01	.1
2416	July 5	" 7	d	m	.2	610.4	474.	138.4	113.6	22.	117.	39.1	14.5	24.6	16.	2.24	.96	1.28	4.76	1.8	2.96	.012	.25

CHEMICAL EXAMINATION OF WATER FROM THE ILLINOIS AND MICHIGAN CANAL AT LOCKPORT. CONTINUED.
(Parts per 1,000,000.)

Serial Number.	1897. Date of Collection.	Examination.	Appearance. Turbidity.	Sediment.	Color.	Residue on Evaporation. Total.	Dissolved.	Suspended.	Loss on Ignition. Total.	Dis-solved	Chlorine.	Oxygen Consumed. Total.	By Dis-solved.	By Suspended Matt'r	Nitrogen as Ammonia. Free Ammonia.	Albuminoid Ammonia. Total.	Dis-solved	Sus-pended	Organic Nitrogen. Total.	Dissolved	Suspended	Nitrogen as Nitrites.	Nitrates.
2449	July 14	July 16	d	m	.5	581.6	430.	151.6	46.8	28.	100.	35.7	15.4	20.3	13.2	2.08	1.12	.96	4.28	2.04	2.24	.02	.14
2176	" 20	" 22	d	m	.8	492.8	444.	48.8	44.	30.	112.	28.2	14.5	13.7	13.6	1.6	1.04	.56	2.68	1.96	.72	.002	.25
2500	" 27	" 29	d	c	.2	522.	477.2	44.8	28.	26.	133.	29 5	16.5	13.	15.2	1.44	.8	.64	2.8	1.6	1.2	.003	.25
2549	Aug. 9	Aug. 11	d	c	.6	523.2	428.8	94.4	41.2	28.8	116.	35 4	21.7	13.7	13.6	1.92	1.6	.32	3.96	2.68	1.28	.001	.25
2570	" 16	" 18	d	c	.5	532.8	492.8	40.	52.	28.8	140.	33.	19.5	13.5	18.4	1.92	1.28	.64	3.16	1.88	1.28	.016	.2
2592	" 23	" 25	d	c	.2	520.8	463.8	57.	50.8	34.4	121.	33.	19.7	13.3	16.8	2.16	1.28	.88	3.78	2.5	1.28	.026	.1
2611	" 30	" 31	d	c	.4	509.2	485.2	24.	38.	36.	140.	33.5	21.1	12.4	19.2	1.92	1.28	.64	3.46	2.34	1.12	.01	.075
2639	Sept. 6	Sept. 8	d	c	.2	437.2	399.6	37.6	51.2	40.8	99.	33.	16.8	16.2	10.8	1.92	1.52	.4	3.54	1.78	1.76	.007	.05
2668	" 13	" 14	d	c	.5	492.4	416.8	75.6	46.4	20.8	107.	30.6	18.7	11.9	13.6	1.76	1.44	.32	3.94	2.66	1.28	.02	.1
2689	" 20	" 21	d	c	.3	520.8	450.	70.8	40.8	24.	110.	37.1	17.	20.1	14.4	2.4	1.44	.96	3.94	2.34	1.6	.035	.1
2721	" 27	" 28	d	c	.6	478.	452.8	25.2	38.	32.8	120.	31.3	23.4	7.9	14.4	1.84	1.44	.4	3.34	2.86	.48	none	.3
2751	Oct. 4	Oct. 5	d	c	.5	460.8	432.8	28.	42.	36.8	105.	36.2	23.6	12.6	15.2	2.4	1.6	.8	3.66	2.86	.8	none	.25
2777	" 11	" 12	d	c	.3	465.6	433.2	32.4	58.4	43.6	104.	32.8	21.8	11.	16.8	2.16	1.84	.32	3.58	2.7	.88	.016	.05
2810	" 16	" 18	d	c	.7	482.	444.4	37.6	46.8	35.2	123.	33.5	24.	9.5	17.6	2.08	1.84	.24	3.66	3.18	.44	.006	.1
2835	" 23	" 25	d	c	.4	504.	418.	86.	53.6	35.2	107.	35.5	19.2	16.3	13.6	2.	1.44	.56	3.66	2.7	.96	.002	.12
2867	" 30	Nov. 1	d	m	.3	487.2	397.2	90.	68.8	37.6	97.	44.8	17.3	27.5	13.6	3.04	1.2	1.84	4.44	2.38	2.03	.02	.7
2905	Nov. 6	" 8	d	c	.5	408.8	366.4	42.	48.8	36.8	81.	32.3	18.5	13.8	11.2	2.24	1.6	.64	4.46	2.06	2.4	.014	.45
2945	" 13	" 15	d	c	.6	520.	477.2	42.8	56.	46.8	114.	38.5	23.	15.5	17.6	2.4	1.92	.48	4.46	3.02	1.44	.004	.6
2977	" 22	" 24	vd	m	.6	525.2	477.6	47.6	66.	61.2	110.	35.	22.8	12.2	12.8	1.76	1.52	.24	4.28	2.68	1.6	.05	.25
2996	" 27	" 29	d	m	.3	433.2	373.2	60.	51.2	31.2	76.	32.7	16.5	16.2	10.4	2.08	1.44	.64	3.83	2.39	1.44	.018	.3
3031	Dec. 7	Dec. 8	d	m	.5	522.	470.	52.	88.8	40.	106.	34.2	19.9	14.3	16.	3.28	1.36	1.92	6.37	3.65	2.72	.05	.2
3061	" 13	" 14	vd	c	.6	438.	391.6	46.4	58.8	30.8	87.	30.6	15.8	14.8	12.	2.4	1.52	.88	4.45	2.49	1.96	.05	.25
3076	" 20	" 21	d	c	.6	523.6	485.2	38.4	57.2	32.	111.	39.	27.	12.	12.4	3.2	2.08	1.12	6.05	3.57	2.48	.022	.9
3106	" 28	" 30	d	c	.5	403.2	374.4	28.8	54.4	33.2	85.	34.2	17.5	16.7		2.4	.....	.....	4.77	2.64	2.08	.05	.6
Average Jan. 4—June 29						684.1	518.0	136.0	84.2	53.1	121.7	42.1	18.4	23.7	10.6	3.2	1.31	1.93	5.79	2.12	3.66	.06	.401
Average July 5—Dec. 28						495.7	438.2	57.5	53.6	34.1	108.8	34.3	18.6	15.7	14.3	2.2	1.38	.8	4.05	2.51	1.54	.018	.273
Average Jan. 4—Dec. 28............						591.8	494.2	97.5	69.2	43.8	115.4	38.3	18.1	20.2	12.4	2.72	1.34	1.38	4.94	2.31	2.62	.039	.339

This water always had a decided odor described as musty or as gassy. The color upon ignition was always brown.

CHEMICAL ANALYSIS OF WATER FROM THE ILLINOIS AND MICHIGAN CANAL AT LOCKPORT.

(Parts Per 1,000,000.)

Serial Number.	1898. Date of Collection.	1898. Date of Examination.	Appearance. Turbidity.	Appearance. Sediment.	Appearance. Color.	Residue on Evaporation. Total.	Residue on Evaporation. Dissolved.	Residue on Evaporation. Suspended.	Residue on Evaporation. Loss on Ignition. Total.	Residue on Evaporation. Loss on Ignition. Dissolved	Chlorine.	Oxygen Consumed. Total.	Oxygen Consumed. By Dissolved.	Oxygen Consumed. By Suspended Matt'r	Nitrogen as Ammonia. Free Ammonia.	Nitrogen as Ammonia. Albuminoid Ammonia. Total.	Nitrogen as Ammonia. Albuminoid Ammonia. Dissolved	Nitrogen as Ammonia. Albuminoid Ammonia. Suspended	Organic Nitrogen. Total.	Organic Nitrogen. Dissolved	Organic Nitrogen. Suspended	Nitrogen as Nitrites.	Nitrogen as Nitrates.
3116	Jan. 1	Jan. 3	d	m	.3	479.2	413.2	65.	61.2	49.1.	95.	34.	15.5	18.5	11.6	3.04	1.12	1.92	5.57	2.37	3.2	.01	.5
3152	" 10	" 11	d	m	.5	484.4	438.	46.4	70.4	41.2	105.	33.6	22.	11.6	13.6	3.52	1.84	1.68	5.88	4.12	1.76	.02	.8
3182	" 18	" 20	d	c	.5	507.	468.8	38.2	70.8	56.	108.	34.	22.5	11.5	13.6	2.48	2.08	.4	5.4	3.8	1.6	.002	.2
3210	" 24	" 26	d	m	.5	578.8	534.8	44.	80.	56.8	105.	36.	25.	11.	13.6	3.04	1.6	1.44	5.4	3.96	1.44	.05	.7
3222	" 31	Feb. 1	d	c	.7	462.	418.4	43.6	64.	34.4	88.	31.9	21.4	10.5	8.8	3.2	2.16	1.04	5.56	3.8	1.76	.01	.55
3249	Feb. 8	" 9	d	c	.5	471.2	457.2	14.	79.6	58.8	97.	33.3	23.3	10.	12.8	3.4	2.1	1.3	5.56	4.44	1.12	.027	.6
3271	" 14	" 16	vd	vm	.5	3034.	556.	2478.	348.	32.8	88.	350.	15.3	334.7	14.4	18.8	1.12	17.68	36.	1.56	34.44	1.75	1.25
3297	" 21	" 23	d	c	.8	746.	721.2	24.8	80.	60.	110.	45.5	28.2	17.3	12.4	5.2	2.88	2.32	9.16	5.4	3.76	.015	.55
3308	" 28	Mar. 1	d	c	.6	656.8	606.4	50.4	81.6	64.4	114.	45.9	27.5	18.4	10.	5.12	3.36	1.76	8.76	5.72	3.04	.002	.45
3330	Mar. 7	" 8	d	c	.4	627.6	586.8	40.8	80.8	52.8	115.	38.3	27.3	11.	14.4	4.	2.88	1.12	6.68	5.4	1.28	.002	.45
3354	" 14	" 15	d	c	.5	413.2	374.4	38.8	68.4	28.8	46.	19.3	15.1	4.2	3.84	2.24	.88	.4	2.36	1.72	.64	.7	.7
3378	" 21	" 22	d	m	.5	558.	501.6	56.4	58.	41.2	48.	23.7	17.6	6.1	6.72	1.6	.8	.8	3.	1.56	1.44	.875	.9
3408	" 26	" 30	d	c	....	502.8	450.	52.8	66.	41.2	67.	27.9	16.8	11.1	6.88	22.4	.96	1.28	4.77	1.73	3.04	.001	.2
3423	Apr. 4	Apr. 5	d	c	.6	615.2	484.8	130.4	77.2	46.	82.	36.8	29.	7.8	7.6	3.68	1.92	1.76	6.69	2.69	4.	.015	.15
3446	" 11	" 12	d	m	.1	730.8	481.6	249.2	118.8	33.	95.	47.8	19.1	28.7	10.	4.96	1.6	3.36	7.97	2.21	5.76	.012	.4
3473	" 18	" 20	d	c	.25	452.8	395.6	57.2	64.8	53.2	73.	31.	17.	14.	9.2	2.72	1.6	1.12	5.09	2.21	2.88	.003	.5
3493	" 25	" 26	d	m	.26	495.2	414.	81.3	54.4	39.2	80.	33.6	15.5	18.	10.	2.56	1.36	1.2	4.45	2.05	2.4	.003	.65
3528	May 2	May 3	d	c	.4	458.8	394.	64.8	54.4	40.	85.	31.4	16.4	15.	12.	2.4	1.28	1.12	5.22	2.14	3.08	.004	.25
3551	" 9	" 10	d	m	.1	687.2	422.8	264.8	100.4	34.	102.	52.1	20.8	31.3	12.	3.68	1.2	2.48	6.98	1.7	5.28	.016	.3
3581	" 16	" 17	d	c	.25	515.6	437.6	78.	85.6	55.2	92.	38.2	19.8	18.4	14.	2.72	1.68	1.04	4.26	1.86	2.4	.011	.35
3611	" 23	" 24	d	m	.5	629.6	504.8	124.8	96.8	55.6	123.	46.2	23.5	22.7	18.	3.52	2.08	1.44	6.34	2.58	3.76	none	.4
3632	" 30	" 31	d	m	.1	612.8	552.	60.8	68.8	60.	138.	35.8	20.5	15.3	15.2	2.4	1.28	1.12	4.74	2.34	2.4	.005	.4
3659	June 6	June 7	d	m	.05	550.4	433.6	116.8	58.	50.4	112.	43.	19.5	23.5	16.8	2.5	1.12	1.38	4.76	1.4	3.36	.018	.4
3681	" 13	" 14	d	m	....	1501.2	613.6	887.6	879.6	36.4	138.	42.8	21.	21.8	18.4	3.04	1.6	1.44	5.88	1.72	4.16	.009	.3
3703	" 20	" 21	d	m	....	638.8	517.2	121.6	50.	11.2	114.	41.5	17.7	23.8	12.8	2.72	1.12	1.6	5.56	1.8	3.76	none	.4
3747	" 27	" 28	d	c	.5	732.4	678.4	54.	46.	42.	163.	19.8	16.7	3.1	16.	1.92	1.36	.56	3.	1.72	1.28	.013	.1
3771	July 2	July 4	d	m	.5	547.2	478.4	68.8	56.8	46.	88.	38.2	19.5	18.7	12.	2.24	1.44	.8	3.8	2.68	1.12	.003	.5

CHEMICAL ANALYSIS OF WATER FROM THE ILLINOIS AND MICHIGAN CANAL AT LOCKPORT—CONTINUED.
(PARTS PER 1,000,000.)

Serial Number.	1898. Date of Collection.	1898. Date of Examination.	Appearance. Turbidity.	Appearance. Sediment.	Appearance. Color.	Residue on Evaporation. Total.	Residue on Evaporation. Dissolved.	Residue on Evaporation. Suspended.	Residue on Evaporation. Loss on Ignition. Total.	Residue on Evaporation. Loss on Ignition. Dissolved	Chlorine.	Oxygen Consumed. Total.	Oxygen Consumed. By Dissolved.	Oxygen Consumed. By Suspended Matt'r	Nitrogen as Ammonia. Free Ammonia.	Nitrogen as Ammonia. Albuminoid Ammonia. Total.	Nitrogen as Ammonia. Albuminoid Ammonia. Dissolved	Nitrogen as Ammonia. Albuminoid Ammonia. Suspended	Organic Nitrogen. Total.	Organic Nitrogen. Dissolved	Organic Nitrogen. Suspended	Nitrogen as Nitrites.	Nitrogen as Nitrates.
3810	July 11	July 12	d	m	.4	548.	443.3	104.8	60.	30.8	126.	36.	17.4	18.6	14.4	1.92	1.36	.56	3.96	2.2	1.76	none	.6
3838	" 18	" 19	d	m	.1	515.2	453.6	61.6	52.	36.	125.	32.2	20.8	11.4	16.8	2.4	1.44	.96	3.6	2.48	1.12	.008	.6
3882	" 26	" 27	d	c	.2	510.8	443.6	67.2	53.2	34.	110.	29.7	17.	12.7	15.2	2.24	1.28	.96	3.76	2.32	1.44	.006	.1
3901	Aug. 1	Aug. 2	vd	vm	.6	578.4	482.	96.4	60.	32.	115.	49.5	17.5	32.	15.2	2.72	1.52	1.2	5.28	2.32	2.96	.023	.35
3930	" 8	" 9	d	m	.3	496.8	452.4	44.4	48.	42.4	118.	31.	10.5	20.5	13.6	2.08	1.12	.96	3.24	2.16	1.08	.023	.1
3956	" 14	" 16	d	m	.15	497.2	450.	47.2	53.2	35.2	125.	28.4	19.6	8.8	13.6	1.6	1.12	.48	3.12	2.	1.12	.01	.35
3987	" 22	" 24	d	c	.3	516.	470.8	45.2	48.	42.	122.	35.	14.1	20.9	13.6	3.12	1.2.	1.92	3.76	1.76	2.	.003	.4
4007	" 29	" 30	d	c	.05	443.2	417.6	25.6	46.	40.	103.	26.8	12.3	14.5	10.8	2.08	1.28	.8	3.12	1.84	1.28	.03	.05
4041	Sept. 4	Sept. 7	d	c	.4	444.4	407.2	37.2	49.2	46.	113.	27.7	17.5	10.2	13.2	1.28	.96	.32	2.16	1.68	.48	none	.05
4061	" 10	" 12	d	c	.2	419.2	374.8	44.4	58.	48.	83.	26.5	13.8	12.7	10.	1.6	1.2	.4	2.8	1.84	.96	none	.3
4088	" 19	" 20	d	c	.06	701.2	671.2	30.	82.	60.	235.	28.9	16.3	12.6	13.2	2.08	1.12	.96	3.76	1.84	1.92	none	.25
4129	" 26	" 28	d	c	.4	663.6	582.4	81.2	104.	47.2	167.	43.	32.	20.	28.	2.24	1.48	.76	5.2	2.56	2.64	none	.65
4170	Oct. 3	Oct. 5	d	m	.3	649.2	552.4	96.8	89.2	38.	165.	44.4	17.	27.4	22.4	2.24	.64	1.6	4.22	1.28	2.96	none	.9
4190	" 10	" 11	d	c	.1	517.6	458.	59.6	61.2	42.	125.	36.	15.3	20.7	17.6	2.24	.96	1.28	3.76	1.41	2.35	.001	.5
4228	" 18	" 19	d	c	.2	498.	476.	22.	50.	42.	128.	32.	16.8	15.2	11.6	1.76	.88	.88	3.33	1.57	1.76	.018	.2
4254	" 24	" 26	d	c	.5	728.	626.	102.	92.	52.	173.	45.1	25.5	19.6	13.2	2.64	1.2	1.44	5.09	2.93	1.16	.004	.75
4302	" 31	Nov. 2	d	m	....	832.	760.	72.	108.	58.	186.	46.	18.8	27.2	17.2	3.2	1.2	2.	6.05	1.97	4.08	.007	.6
4329	Nov. 7	" 8	d	c	.6	662.8	586.	76.8	92.4	64.	140.	44.	17.7	26.3	13.2	3.2	1.76	1.44	6.51	2.03	4.48	.004	.75
4364	" 14	" 15	d	c	.4	596.8	538.	58.8	62.	40.	81.	29.5	14.8	14.7	6.8	2.24	1.04	1.2	4.27	1.55	2.72	.008	.2
4405	" 21	" 23	d	m	.3	662.8	602.	60.8	88.	64.	135.	36.	17.3	18.7	7.6	2.56	1.36	1.2	4.75	2.11	2.64	.014	.5
4425	" 28	" 29	d	c	.3	662.	608.	54.	96.	52.	190.	38.2	15.8	22.4	10.	3.2	1.6	1.6	5.23	2.59	2.64	.007	.75
4457	Dec. 6	Dec. 7	d	c	.3	550.8	502.8	48.	78.	50.8	145.	29.6	15.6	14.	9.2	2.08	1.24	.84	3.65	2.21	1.44	.001	.15
4478	" 12	" 13	d	c	.5	527.2	460.	67.2	100.	58.	116.	39.5	19.7	19.8	10.8	2.52	2.24	1.28	3.89	3.81	2.08	.008	.25
4506	" 19	" 21	d	c	.7	572.8	470.8	102.	106.	74.	135.	44.7	25.	19.7	7.6	3.36	1.6	1.76	5.89	8.85	3.04	.02	.25
4539	" 26	" 28	d	c	.5	612.8	560.8	52.	93.6	72.	145.	45.	26.2	18.8	12.8	3.52	2.16	1.36	5.89	3.81	2.08	.01	.25
Average Jan. 1—June 27						813.1	494.5	318.6	113.9	45.2	99.3	48.2	20.4	27.7	12.1	3.68	1.65	3.02	6.73	2.76	3.96	.137	.47
Average July 2—Dec. 27						575.1	512.7	64.4	72.5	47.9	134.3	36.2	17.8	18.3	13.4	2.05	1.32	.72	4.31	22.2	2.08	.01	.36
Average Jan. 1—Dec. 26............						694.1	503.6	190.5	93.2	48.5	116.8	42.2	19.1	13.	12.7	2.86	1.48	1.38	5.52	24.9	3.02	.072	.41

Odor uniformly gassy, Color upon ignition uniformly brown.

CHEMICAL EXAMINATION OF WATER FROM THE ILLINOIS AND MICHIGAN CANAL AT LOCKPORT.
(Parts per 1,000,000.)

Serial Number.	1899. Date of		Appearance.			Residue on Evaporation.					Chlorine.	Oxygen Consumed.			Nitrogen as Ammonia				Organic Nitrogen.			Nitrogen as	
	Collection.	Examination	Turbidity.	Sediment.	Color.	Total.	Dissolved.	Suspended.	Loss on Ignition. Total.	Loss on Ignition. Dissolved.		Total.	By Dissolved.	By Suspended Matt'r	Free Ammonia.	Albuminoid Ammonia. Total.	Albuminoid Ammonia. Dissolved.	Albuminoid Ammonia. Suspended	Total.	Dissolved.	Suspended	Nitrites.	Nitrates.
4563	Jan. 2	Jan. 4	d	c	.6	584.8	548.	36.8	98.	74.	140.	46.5	27.	19.5	12.4	3.84	2.64	1.2	6.85	4.77	2.08	.005	.2
4599	" 9	" 11	d	c	.6	851.6	842.	9.6	114.8	100.	275.	42.3	24.7	17.6	12.8	4.16	2.4	1.76	8.77	4.77	4.	.01	.2
4625	" 18	" 20	d	m	.5	610.8	573.2	37.6	112.	70.	170.	44.4	22.	22.4	12.	2.56	1.92	.64	5.25	2.37	2.88	.007	.2
4645	" 24	" 25	d	c	.5	413.2	392.	21.2	76.	64.	77.	36.3	21.5	14.8	11.2	2.72	1.76	.96	5.25	3.01	2.24	.024	.25
4659	" 30	" 31	d	c	.4	580.8	541.2	39.6	108.	76.	118.	43.2	26.5	16.7	12.4	3.84	2.72	1.12	6.69	4.77	1.92	.002	.25
4680	Feb. 6	Feb. 7	d	m	.3	433.2	392.8	40.4	88.	80.	90.	39.5	24.2	15.3	10.8	3.52	2.16	1.36	5.84	3.7	1.84	.007	.2
4724	" 20	" 21	d	m	.3	536.	490.8	45.2	84.	61.	127.	46.	24.3	21.7	12.4	3.2	1.92	1.28	6.02	3.46	2.56	none	.25
4752	" 27	" 28	d	m	.6	832.8	702.	130.8	120.	76.	265.	49.	26.5	22.5	10.	3.68	2.24	1.44	6.66	4.	2.66	.003	.1
4777	Mar. 6	Mar. 7	vd	vm	.5	770.	726.	44.	118.	104.	254.	46.5	25.	21.5	7.2	4.	2.	2.	7.14	3.7	3.44	.008	.2
4804	" 13	" 14	d	m	.5	808.8	648.	160.8	120.	74.	200.	44.3	25.3	19.	14.	5.04	2.56	2.48	10.	5.14	4.86	.006	.25
4839	" 20	" 22	d	m	.4	696.8	612.	84.8	114.	72.	182.	39.8	23.5	16.3	8.	2.76	1.2	1.56	4.67	2.51	2.16	.008	.15
4861	" 27	" 29	d	m	.5	582.8	506.	76.8	124.	76.	122.	45.	28.4	16.6	9.6	3.84	2.	1.84	7.07	4.67	2.4	.017	.1
4887	Apr. 3	Apr. 4	d	c	.4	574.8	472.	102.8	110.	76.	115.	45.	26.	19.	9.2	3.68	1.92	1.76	7.39	3.4	3.99	.016	.1
4912	" 10	" 11	d	c	.1	802.	714.	88.	120.	86.	240.	43.	27.5	15.5	13.2	3.04	1.44	1.6	6.43	3.39	3.04	.002	.15
4937	" 17	" 18	d	c	.5	591.2	534.	57.2	100.	88.	108.	41.5	24.	17.5	11.2	2.72	1.84	.88	4.99	3.39	1.6	.002	.15
4963	" 24	" 26	d	c	.1	609.2	551.6	57.6	102.	60.	121.	41.	24.5	16.5	14.	3.2	1.6	1.6	5.05	2.97	2.08	.002	.2
5072	May 22	May 23	d	m	.3	633.2	558.	75.2	73.6	56.	107.	48.	27.2	20.8	16.2	3.68	1.04	2.64	5.85	1.85	4.	none	.25
5118	" 29	" 31	d	c	.2	826.	688.	138.	74.8	60.	187.5	38.5	18.6	19.9	27.2	3.84	1.05	2.78	6.33	2.09	4.24	.002	.28
5158	June 5	June 6	d	c	.7	749.2	660.	89.2	69.2	48.8	133.	43.3	20.	23.3	9.2	2.96	1.24	1.71	4.57	2.89	1.68	.002	.2
5204	" 12	" 14	d	c	.5	633.2	508.4	124.8	82.8	48.4	109.5	59.5	27.1	32.4	16.	2.96	1.18	1.77	5.96	2.2	3.76	.001	.32
5248	" 19	" 21	vd	vm	.6	675.6	574.8	100.8	84.8	74.	125.	58.	23.5	34.5	20.8	2.88	1.36	1.52	5.08	2.52	2.56	none	.32
5291	" 26	" 27	d	m	.25	590.8	484.	106.8	55.2	30.4	108.	47.	20.5	26.5	15.2	2.64	1.18	1.45	5.08	2.44	2.64	"	.12
5331	July 3	July 4	d	m	.5	562.4	447.2	115.2	71.2	50.	109.	41.4	21.7	19.7	14.6	2.8	.8	2.	5.56	2.68	2.88	"	.2
5387	" 10	" 11	d	c	.6	534.	480.4	53.6	63.2	48.	104.	34.5	15.9	18.6	12.8	2.24	.73	1.51	4.76	1.49	3.264	.001	.24
5434	" 17	" 18	d	c	.9	582.8	511.2	71.6	55.2	44.8	123.	22.6	16.4	6.2	6.72	1.024	.57	.44	2.04	1.27	.768	.45	.24

CHEMICAL EXAMINATION OF WATER FROM THE ILLINOIS AND MICHIGAN CANAL AT LOCKPORT.—CONTINUED.
(Parts per 1,000,000.)

Serial Number.	1899. Date of Collection.	Examination.	Appearance. Turbidity.	Sediment.	Color.	Residue on Evaporation. Total.	Dissolved.	Suspended.	Loss on Ignition. Total.	Dis-solved.	Chlorine.	Oxygen Consumed. Total.	By Dis-solved.	By Suspended Matt'r	Nitrogen as Ammonia. Free Ammonia.	Albuminoid Ammonia. Total.	Dis-solved.	Sus-pended	Organic Nitrogen. Total.	Dissolved.	Suspended	Nitrogen as Nitrites.	Nitrates.
5483	July 24	July 25	d	m	.7	592.4	510.4	82.	101.6	70.	102.	40.3	21.7	18.6	13.6	2.4	1.04	1.36	4.36	3.	1.36	none	.8
5532	" 31	Aug. 1	vd	c	.5	525.2	451.6	73.6	96.4	78.8	98.	41.	17.	24.	11.6	2.24	1.04	1.2	4.76	1.8	2.96	.005	.2
5577	Aug. 7	" 8	vd	vm	.5	548.8	482.4	66.4	79.2	49.6	130.5	43.4	23.	20.4	20.	2.16	.96	1.2	4.44	2.04	2.4	none	.2
5628	" 14	" 15	d	m	.5	532.8	468.4	64.4	92.	72.4	118.	43.3	23.5	19.8	16.	2.16	.736	1.42	5.76	1.48	4.28	"	.16
5676	" 21	" 22	d	m	.6	504.	439.6	64.4	74.8	51.2	106.	36.3	24.3	12.	15.2	2.56	1.47	1.08	5.24	3.32	1.92	.001	.28
5731	" 28	" 29	d	c	.5	553.6	484.	69.6	71.6	40.	118.	35.4	25.2	10.2	18.	2.4	1.44	.96	4.12	3.	1.12	none	.28
5790	Sept. 4	Sept. 5	d	m	.8	488.	423.6	64.4	52.8	30.4	103.	32.2	17.8	14.4	15.	2.24	.608	1.63	4.76	1.94	2.81	.004	.16
5837	" 11	" 12	d	m	.6	558.	409.4	67.6	81.6	63.6	129.5	36.9	18.8	18.1	17.6	2.32	.704	1.61	4.44	1.24	3.2	none	.16
5882	" 18	" 19	d	m	.5	501.6	441.2	60.4	70.4	44.4	110.	33.2	17.4	15.8	15.4	2.24	.72	1.52	4.28	2.44	1.84	.002	.2
5836	" 25	" 26	d	m	.7	582.	506.4	75.6	63.2	40.	139.	45.6	23.6	22.	18.	2.24	1.44	.8	4.26	2.5	1.76	none	.24
5984	Oct. 2	Oct. 3	d	m	.5	526.	451.6	74.4	61.6	36.4	114.	41.1	21.4	19.7	14.	2.4	1.44	.96	4.74	2.66	2.08	"	.16
6079	" 16	" 17	d	m	.2	480.4	415.2	65.2	52.8	20.4	116.	23.5	11.8	11.7	14.8	2.16	.96	1.2	4.68	2.04	2.64	"	.2
6146	" 23	" 24	d	m	.7	489.2	431.2	58.	36.8	15.6	118.	31.3	16.3	15.	14.8	2.8	.67	2.12	4.68	1.86	2.81	"	.28
6193	" 30	" 31	d	m	.7	532.8	468.	64.8	56.4	30.8	116.5	26.3	12.3	14.	14.8	2.96	.8	2.16	5.48	1.4	4.08	.003	.4
6243	Nov. 6	Nov. 7	d	m	.5	546.	498.4	47.6	45.6	23.2	121.	34.7	14.8	19.9	14.8	2.8	1.28	1.52	5.48	2.12	3.36	none	.28
6279	" 13	" 14	d	c	.4	534.	476.4	57.6	59.2	28.4	lost	28.9	8.9	20.	13.6	2.16	.51	1.64	4.56	1.32	3.24	"	.08
6338	" 20	" 21	d	m	.6	613.6	498.8	114.8	67.2	24.8	125.	35.	12.	23.	16.	3.36	1.92	1.44	6.92	3.4	3.52	"	.2
6400	" 27	" 28	d	m	.3	529.6	460.8	68.8	55.2	22.	123.	35.5	....	....	17.6	2.56	1.28	1.28	4.52	2.6	1.92	.001	.08
6446	Dec. 4	Dec. 6	d	m	.4	531.2	451.2	80.	64.4	37.6	111.	27.3	18.7	8.6	15.2	2.4	1.44	.96	5.	2.34	2.65	.001	.16
6543	" 18	" 20	d	c	.04	553.2	483.6	69.6	81.2	40.8	111.5	27.3	14.6	12.7	14.4	4.32	2.08	2.24	6.76	3.16	3.6	.002	.16
6583	" 26	" 27	d	m	.6	633.6	562.4	71.2	69.2	44.	167.5	36.6	23.	13.6	20.	4.	2.24	1.76	7.72	5.48	2.24	.005	.2
Average Jan. 2—June 26						653.9	578.1	75.8	97.7	70.6	153.3	44.8	24.4	20.4	12.4	3.39	1.79	1.60	6.21	3.36	2.84	.0056	.20
Average July 3—Dec. 26						543.1	472.2	70.8	67.6	41.9	117.9	34.7	18.2	16.4	15.2	2.54	1.12	1.42	4.97	2.35	2.61	.0198	.23
Average Jan. 2—Dec. 26						596.1	522.9	73.2	82.	55.6	135.2	39.5	21.2	18.4	13.9	2.95	1.44	1.51	5.56	2.84	2.72	.013	.21

Odor uniformly gassy, Color upon ignition uniformly brown.

CHEMICAL ANALYSIS OF WATER FROM THE ILLINOIS AND MICHIGAN CANAL AT LOCKPORT.
(Parts per 1,000,000.)

Serial Number.	1900. Date of Collection.	Date of Examination	Appearance. Turbidity.	Appearance. Sediment.	Appearance. Color.	Residue on Evaporation. Total.	Residue on Evaporation. Dissolved.	Residue on Evaporation. Suspended.	Loss on Ignition. Total.	Loss on Ignition. Dissolved.	Chlorine.	Oxygen Consumed. Total.	Oxygen Consumed. By Dissolved.	Oxygen Consumed. By Suspended Matt'r	Nitrogen as Ammonia. Free Ammonia.	Albuminoid Ammonia. Total.	Albuminoid Ammonia. Dissolved.	Albuminoid Ammonia. Suspended	Organic Nitrogen. Total.	Organic Nitrogen. Dissolved.	Organic Nitrogen. Suspended	Nitrogen as Nitrites.	Nitrogen as Nitrates.
6608	Jan. 2	Jan. 3	d	c	.5	513.6	444.4	69.2	59.6	39.2	107.	34.3	22.8	11.5	10.4	3.36	2.08	1.28	8.52	4.84	3.68	.002	.64
6643	" 8	" 9	d	c	.4	440.4	376.4	64.	43.6	28.8	90.	21.1	14.8	6.3	10.4	2.48	1.04	1.44	4.84	2.44	2.4	.001	.24
6688	" 15	" 16	d	c	.5	535.6	458.	67.6	60.4	21.6	134.	24.6	17.2	7.4	12.8	3.36	2.16	1.2	6.4	3.36	3.04	.001	.2
6738	" 22	" 24	d	c	.5	458.	439.	19.	42.8	31.6	108.	20.6	11.6	9.	9.6	2.24	1.04	1.2	5.28	1.68	3.6	.015	.2
6780	" 29	" 31	d	c	.25	545.2	230.	315.2	55.6	25.6	151.	16.3	13.1	3.2	13.2	2.56	1.76	.8	4.8	2.24	2.56	.002	.2
6841	Feb. 5	Feb. 6	d	c	.6	372	342.4	29.6	41.2	24.	82.75	18.9	10.6	8.3	6.4	1.92	.46	1.45	4.16	.99	3.16	.017	.16
7022	Mar 5	Mar. 6	d	c	.4	499.2	431.6	67.6	44.4	28.	113.	21.7	11.9	9.8	10.4	3.36	1.76	1.6	7.04	4.	3.04	0.14	.36
7069	" 12	" 13	d	c	.3	369.2	255.6	113.6	42.8	38.	58.7	22.	9.4	12.6	15.76	1.84	.64	1.2	4.64	1.18	3.45	.075	.84
7117	" 19	" 20	d	c	.4	434.	384.4	49.6	33.2	32.8	78.3	21.9	11.8	10.1	6.4	2.4	1.21	1.18	4.76	2.52	2.24	.15	.72
7165	" 26	" 27	d	c	.3	399.6	372	27.6	39.2	32.4	73.2	18.8	11.1	7.7	7.2	1.92	1.02	.89	4.44	2.6	1.84	.17	.4
7217	Apr. 2	Apr. 3	d	c	.5	526.	497.2	28.8	35.2	24.	130.5	22.5	11.3	11.2	11.2	2.88	1.28	1.6	5.24	2.52	2.72	.002	.2
7272	" 9	" 10	d	l	.5	643.6	632.8	10.8	50.	45.2	175.	22.4	14.9	7.5	13.6	2.64	1.68	.96	5.24	3.32	1.92	.003	.12
7328	" 16	" 17	d	c	.4	509.6	482.	27.6	24.8	18.4	117.	18.	11.2	6.8	10.8	1.6	.7	.89	3.48	1.36	2.11	.004	.24
7398	" 29	" 24	d	m	.04	571.6	522.8	488.	38.	32.8	119.8	21.4	10.7	10.7	14.4	2.16	.69	1.47	3.48	1.72	1.76	.004	.2
7438	May 1	May 1	d	c	.15	360.4	271.2	89.2	32.	19.2	53.	18.7	7.9	10.8	5.92	1.36	.43	.92	3.14	1.14	2.	.003	.2
7480	" 8	" 9	d	c	.3	451.2	372.	85.2	28.4	28.	101.	18.8	9.3	9.5	11.2	1.36	.7	.65	2.98	1.14	1.84	.003	.24
7533	" 15	" 16	d	c	....	425.2	397.6	27.6	36.4	21.2	88.	16.6	9.1	7.5	7.2	2.24	.64	1.6	3.14	.74	2.4	.004	.12
7587	" 22	" 23			.1	462.4	448.	14.4	29.6	26.4	120.	16.5	11.2	5.3	15.2	1.47	.53	.94	2.18	.8	1.38	.003	.08
7623	" 29	" 30	d	c	.2	505.2	496.8	8.4	37.2	35.6	152.5	20.6	11.4	9.2	21.48	1.28	.73	.54	2.18	1.22	.96	.02	.4
7654	June 4	June 5	d	c	.5	579.2	539.6	39.6	52.	39.6	165.5	17.4	10.8	6.6	19.2	1.44	.45	.99	2.9	1.86	1.04	none	.24
7703	" 11	" 13	d	c	.3	467.2	440.8	26.4	44.4	29.2	107.	17.2	8.2	9.	12.4	1.36	.45	.91	2.74	1.6	1.14	.011	.2
7739	" 18	" 19	d	c	.2	666.8	640.4	26.4	45.2	39.6	217.	23.1	15.7	7.4	21.6	1.52	1.05	.46	2.74	2.1	.64	none	.12
7781	" 26	" 27	d	m	.3	722.8	659.2	63.6	56.4	37.6	227.	26.9	12.7	14.2	22.4	1.41	1.15	.25	3.88	1.54	2.34	.002	.2
7822	July 3	July 4	d	l	.01	363.6	319.2	44.4	29.6	17.6	75.	13.2	7.8	5.4	6.4	.88	.24	.64	1.46	.74	.72	.002	.12
7893	" 9	" 11	d	l	.2	500.	442.8	57.2	36.	20.	120.5	16.8	8.3	8.5	8.8	.57	.49	.08	.97	.64	.32	.004	.04
7938	" 16	" 17	d	l	.03	437.6	406.4	31.2	37.6	28.4	117.	16.2	7.2	9.	8.8	.88	.35	.52	1.28	.61	.66	tr'ce	.12

CHEMICAL EXAMINATION OF WATER FROM THE ILLINOIS AND MICHIGAN CANAL AT LOCKPORT.— CONTINUED.

(Parts per 1,000,000.)

Serial Number.	1900. Date of Collection.	Date of Examination.	Appearance. Turbidity.	Appearance. Sediment.	Appearance. Color.	Residue on Evaporation. Total.	Residue Dissolved.	Residue Suspended.	Loss on Ignition. Total.	Loss on Ignition. Dissolved.	Chlorine.	Oxygen Consumed. Total.	Oxygen Consumed. By Dissolved.	Oxygen Consumed. By Suspended Matt'r.	Nitrogen as Ammonia. Free Ammonia.	Albuminoid Ammonia. Total.	Albuminoid Ammonia. Dissolved.	Albuminoid Ammonia. Suspended.	Organic Nitrogen. Total.	Organic Nitrogen. Dissolved.	Organic Nitrogen. Suspended.	Nitrogen as Nitrites.	Nitrogen as Nitrates.
8008	July 23	July 24	d	l	.02	418.8	392.	26.8	24.4	24.	117.5	10.7	7.8	2.9	12.	.96	.29	.67	1.8	.61	1.18	.001	.2
8057	" 30	" 31	d	l	.02	582.4	570.4	12.	46.	46.	182.	16.7	14.8	1.9	13.6	1.25	.45	.8	2.52	1.08	1.44	tr'ce	.24
8113	Aug. 6	Aug. 8	d	l	.02	609.2	572.8	36.4	45.6	45.2	193.	21.	8.4	12.6	19.2	1.36	.48	.88	3.32	1.11	2.2	.001	.12
8173	" 13	" 15	d	l	.02	408.	583.6	25.4	44.4	30.4	116.	17.1	6.5	10.5	12.	1.18	.21	.97	1.88	.44	1.44	trc'e	.4
8233	" 20	" 21	d	l	.02	595.2	513.6	71.6	45.2	23.6	188.	27.1	10.6	16.5	19.2	1.68	.33	1.34	3.32	.57	2.74	"	.2
8307	" 27	" 28	d	l	.02	551.2	529.6	21.6	35.6	20.	166.5	18.7	6.8	11.9	9.2	1.09	.37	.72	2.04	.54	1.5	"	.08
8368	Sept. 4	Sept. 5	d	l	.02	595.6	558.4	37.2	38.8	22.8	184.	16.7	7.	9.7	21.6	1.28	.33	.84	2.46	.41	2.05	none	.28
8436	" 10	" 11	d	c	.1	565.6	516.8	48.8	58.	31.6	170.	25.3	7.4	17.9	19.2	1.44	.43	1.	2.86	.72	2.14	.001	.16
8491	" 17	" 19	d	c	.2	724.8	281.6	443.2	49.2	45.6	256.5	23.8	11.7	12.1	24.8	1.6	.49	1.1	2.14	.56	1.58	.001	.2
8546	" 24	" 27	vd	vm	...	833.6	605.6	228.	76.	27.2	212.5	41.2	18.1	23.1	20.	2.96	.35	2.6	6.04	.93	5.11	none	.28
8594	Oct. 1	Oct. 2	d	l	.4	613.2	525.2	88.	47.2	18.4	189.	28.3	13.5	14.8	.37	1.76	.72	1.04	2.7	1.1	1.6	"	.08
8673	" 15	" 17	s	l	.01	465.2	421.6	43.6	34.8	27.6	131.	19.	14.2	4.8	.32	1.28	.67	.6	2.75	1.39	1.36	.008	.232
8699	" 23	" 25	d	l	.02	526.8	472.	54.8	36.4	30.8	159.5	22.3	13.2	9.1	19.8	.59	.53	.06	3.07	.48	2.59	.004	.156
8725	" 29	" 31	d	l	...	425.2	380.8	44.4	36.	22.8	112.	20.2	10.7	9.5	14.4	1.57	.51	1.05	2.91	1.23	1.68	.001	.32
8761	Nov. 5	Nov. 10	d	l	.1	411.6	392.	19.6	34.	30.	110.5	16.3	8.1	8.2	12.	.62	.33	.29	2.67	1.47	1.2	.004	.276
8774	" 12	" 13	d	l	.08	511.6	459.2	52.4	34.8	21.6	145.	20.4	11.3	9.1	.3	1.12	.67	.4	3.31	1.33	1.98	.004	1.596
8791	" 19	" 20	d	c	.1	546.	458.4	87.6	35.6	21.6	144.	22.2	13.2	9.	15.2	2.48	.7	1.77	4.75	1.29	3.45	.004	.316
8831	" 26	" 27	d	c	.2	579.2	468.4	110.8	45.6	29.2	135.	23.4	12.3	11.1	18.4	2.24	.49	1.74	3.95	1.23	2.72	.001	.24
8889	Dec. 11	Dec. 12	d	l	.25	449.2	439.2	10.	24.	20.4	121.5	18.1	15.	3.1	.32	1.28	.89	.33	2.91	1.79	1.12	.004	.116
8907	" 18	" 21	d	l	...	515.6	486.4	29.2	54.	42.	149.5	17.8	14.9	2.9	17.6	2.16	1.57	.59	4.27	2.75	1.52	.002	.078
8925	" 26	" 27	d	m	.02	827.6	409.6	418.	78.	30.4	79.5	37.2	13.4	23.8	9.6	3.04	.64	2.4	6.67	1.	5.66	.036	.444
Average Jan. 2—June 26						498.4	441.	57.3	42.2	30.3	120.4	20.8	12.1	8.7	12.51	2.09	1.02	1.06	4.27	2.04	2.23	.022	.34
Average July 3—Dec. 26						544.	458.5	85.4	42.7	28.3	149.1	21.2	10.9	10.3	12.63	1.42	.52	.9	3.	1.	2.	.023	.254
Average Jan. 2—Dec. 26						521.7	450.	71.7	42.5	29.3	135.	21.	11.5	9.5	12.60	1.77	.77	1.	3.62	1.51	2.11	.023	.289

The odor was uniformly gassy or musty. The color upon ignition was brown.

CHEMICAL EXAMINATION OF WATER FROM THE DESPLAINES RIVER AT LOCKPORT.
(Parts Per 1,000,000.)

Serial Number.	1897. Date of		Appearance.			Residue on Evaporation.					Chlorine.	Oxygen Consumed.			Nitrogen as Ammonia				Organic Nitrogen.			Nitrogen as	
									Loss on Ignition.						Free Ammonia.	Albuminoid Ammonia.							
	Collection.	Examination.	Turbidity.	Sediment.	Color.	Total.	Dissolved.	Suspended.	Total.	Dissolved.		Total.	By Dissolved.	By Suspended Matt'r		Total.	Dissolved.	Suspended	Total.	Dissolved.	Suspended	Nitrites.	Nitrates.
797	Jan. 4	Jan. 6	vd	m	.6	426	238.	188.	28.8	10.8	13.	17.3	13.4	3.9	2.566	.72	.36	.36	1.52	.88	.64	.062	2.1
1815	" 11	" 13	d	1	....	381.6	364.4	17.2	17.6	12.	9.	12.9	.....	.	.07	.32	..	..	.88	.....	.....	.04	3.4
1851	" 25	" 28	d	1	....	437.6	421.6	16.	14.4	4.8	26.	14.	.....	.	2.748	.8	..	..	1.52	.....	.....	.04	2.1
1874	Feb. 1	Feb. 3	d	1	.1	827.2	810.8	16.4	16.	12.	98.	7.8	.....	.....	.38	.4	.....	..	.72	.....	.....	.008	2.2
1898	" 9	" 10	s	1	.1	598.4	592.	6.4	20.8	10.	10.	7.3	.....	.	.32	.28	.....	..	.72	.....	.....	.023	1.7
1916	" 15	" 16	d	1	.3	373.6	368.4	5.2	12.8	10.	4.6	6.5	.....	.....	.088	.24	.....	.....	.72	.....	.....	.01	1.7
1935	" 22	" 24	d	c	....	422.	195.2	226.8	36.8	27.2	3.8	9.2	.....	.	.062	.36	.....	.....	.72	.....	.....	.05	1.6
1955	Mar. 1	Mar. 2	s	1	.03	315.2	313.2	2.	38.	38.	4.	8.5	.....	.	.222	.44	.....	.....	.55	.....	.....	.015	2.2
1975	" 8	" 9	d	1	.15	324.8	322.2	2.6	37.2	36.4	4.6	7.	.....	.	.04.	.2	.....	.....	.67	.....	.....	.013	1.7
2007	" 15	" 16	d	c	....	278.	202.	76.	41.2	34.	3.	16.	.....	.	.112	.6	.....	.....	1.35	.....	.....	.05	1.8
2032	" 22	" 23	vd	m	.8	599.6	206.4	393.2	76.4	36.8	2.4	35.7	11.4	24.3	.094	1.12	.288	.832	2.83	.....	.....	.055	1.8
2057	" 29	" 30	vd	c	....	259.2	226.4	33.2	44.	33.2	3.1	10.7	.....	..	.066	.36	.....	.....	.83	.....	.....	.025	1.7
2088	Apr. 5	Apr. 6	d	c	.5	272.8	245.6	27.2	30.	29.6	3.3	11.	.....	.....	.012	.4	.....	.....	.75	.....	.....	.045	1.8
2115	" 13	" 14	d	1	....	310.	300.	10.	30.	25.6	3.6	9.1	.....	.....	.014	.36	.....	..	.67	.....	.....	.015	1.2
2130	" 19	" 20	d	1	....	350.8	325.2	25.6	31.6	28.8	4.1	12.1	.....	.....	.01	.36	.....	.....	.83	.....	.....	.02	1.
2158	" 26	" 28	d	c	....	357.2	321.2	36.	47.2	44.	4.	14.1	.....	.....	.044	.48	.....	.....	.71	.....	.....	.034	.7
2180	May 3	May 4	d	1	....	294.	288.8	5.2	23.6	23.2	3.2	14.	.....	.....	.003	.44	.....	.....	.87	.....	.....	.007	1.
2206	" 10	" 12	s	1	.2	328.	316.	12.	34.8	30.4	3.5	9.	.....	.....	.062	.36	.....	.....	1.35	.....	.....	.006	.2
2222	" 17	" 18	s	1	.15	350.8	350.	.8	34.	33.2	4.2	12.3	.....	.....	.01	.36	.....	.....	.67	.....	.....	.002	.4
2262	" 24	" 26	s	1	.3	324.	307.2	16.8	32.	18.4	4.3	8.5	.....	.....	.018	.4	.....	..	.83	.....	.....	none	.3
2282	" 31	June 2	s	1	.5	345.6	345.2	.4	33.2	28.	5.2	8.5	.....	.....	.008	.36	.....	.....	.67	.....	.....	none	.2
2299	June 7	" 8	s	1	.05	328.8	328.8	0.0	28.	27.6	5.	9.1	.....	.....	.006	.5	.....	..	.65	.....	.....	none	.15
2321	" 14	" 15	s	1	.2	366.	355.2	10.8	41.2	24.	5.7	13.8	.....	.....	.008	.52	..	.....	.81	.....	.....	.01	.2
2368	" 22	" 24	d	1	.2	300.4	300.	.4	26.4	18.	4.7	14.	.....	.....	.022	.52	.....	.....	.65	.....	.....	.022	.5
2397	" 29	July 1	d	1	.15	341.2	317.2	24.	22.	18.	4.	9.1	.....	.....	.03	.44	.....	..	.65	.....	.....	.002	.1
2415	July 5	" 7	s	1	.3	345.2	335.2	10.	47.2	28.4	4.	9.1	.....	.....	.046	.52	.....	.....	1.32	.....	.....	.002	.2
2450	" 14	" 16	d	1	.2	356.	342.	14.	28.	24.	6.	12.2	.....	.....	.038	.48	.....	.....	.84	.....	.....	none	.2

CHEMICAL EXAMINATION OF WATER FROM THE DESPLAINES RIVER AT LOCKPORT.—CONTINUED.
(Parts per 1,000,000.)

Serial Number.	1897. Date of		Appearance.			Residue on Evaporation.			Loss on Ignition.		Chlorine.	Oxygen Consumed.			Nitrogen as Ammonia	Albuminoid Ammonia.			Organic Nitrogen.			Nitrogen as	
	Collection.	Examination.	Turbidity.	Sediment.	Color.	Total.	Dissolved.	Suspended.	Total.	Dissolved.		Total.	By Dissolved.	By Suspended Matt'r.	Free Ammonia.	Total.	Dissolved.	Suspended.	Total.	Dissolved.	Suspended.	Nitrites.	Nitrates.
2475	July 20	July 22	s	l	.3	368.	342.	26.	38.8	21.2	8.5	13.1	.....	.....	.034	.44	.....	.....	1.	.....	.....	.001	.2
2501	" 27	" 29	s	l	.15	361.2	356.	5.2	28.	26.	7.7	14.4	.....	.....	.024	.88	.....	.....	1.08	.....	.....	.001	.2
2548	Aug. 9	Aug. 11	d	c	.15	530.8	508.8	22.	29.6	19.6	55.	14.7	.....	.....	.352	.64	.....	.....	1.16	.....	.....	.11	.25
2571	" 16	" 18	s	l	.1	534.	528.8	5.2	44.	22.8	10.	7.3	.....	.....	.088	.28	.....	.....	.56	.....	.....	.056	.4
2593	" 23	" 25	d	l	.09	539.	537.6	1.4	38.8	22.4	35.	7.1	.....	.....	1.086	.32	.....	.....	.62	.....	.....	.11	.45
2612	" 30	" 31	s	l	.2	376.4	373.2	3.2	30.	25.2	13.	14.5	.....	.....	.12	.64	.....	.....	1.04	.....	.....	.003	.1
2638	Sept. 6	Sept. 8	d	l	.06	482.8	471.6	11.2	28.	24.8	43.	9.5	.....	.....	.2	.4	.....	.....	.86	.....	.....	.2	.05
2669	" 13	" 14	d	l	.1	701.6	685.2	16.4	35.6	33.2	33.	9.3	.....	.....	1.18	.44	.....	.....	.58	.....	.....	.24	.2
2690	" 20	" 21	d	c	.1	695.6	686.8	8.8	30.8	28.	23.	10.8	.....	.....	.32	.52	.....	.....	.82	.....	.....	.125	.3
2722	" 27	" 28	d	c	.1	701.2	572.	129.2	35.2	13.2	25.	9.5	.....	.....	.56	.52	.....	.....	1.1	.....	.....	.225	.4
2752	Oct. 4	Oct. 5	s	c	.06	650.	630.8	19.2	42.8	34.	31.	10.6	.....	.....	1.8	.44	.....	.....	.94	.....	.....	.3	.35
2776	" 11	" 12	d	c	.1	716.8	716.	.8	56.	52.	23.	11.2	.....	.....	.28	.52	.....	.....	.94	.....	.....	.2	.4
2809	" 16	" 18	s	l	.05	682.4	667.6	14.8	48.	45.2	25.	8.4	.....	.....	.4	.32	.....	.....	.78	.....	.....	.25	.6
2836	" 23	" 25	d	c	.1	618.8	608.8	10.	40.	36.	51.	11.6	.....	.....	4.	.56	.....	.....	1.26	.....	.....	.3	.62
2868	" 30	Nov. 1	s	l	.03	704.	696.4	7.6	58.	52.	20.	7.2	.....	.....	.2	.36	.....	.....	.7	.....	.....	.095	.3
2906	Nov. 6	" 8	d	l	.07	729.2	728.8	.4	72.	70.	19.	6.8	.....	.....	.36	.28	.....	.....	1.02	.....	.....	.07	.25
2946	" 13	" 15	d	l	.06	735.6	697.2	38.4	47.2	42.4	22.	11.	.....	.....	.48	.52	.....	.....	1.02	.....	.....	.04	.6
2978	" 22	" 24	s	l	.07	542.	538.	4.	47.2	44.8	8.	8.8	.....	.....	.032	.24	.....	.....	.62	.....	.....	.003	.2
2995	" 27	" 29	d	c	.1	524.8	519.2	5.6	30.	28.8	49.	13.2	.....	.....	5.8	.8	.....	.....	1.29	.....	.....	.04	.65
3030	Dec. 7	Dec. 8	d	c	.1	603.6	589.2	14.4	66.8	29.2	37.	7.	.....	.....	3.6	.48	.....	.....	.77	.....	.....	.05	.6
3062	" 13	" 14	d	c	.1	643.2	629.2	14.	57.2	47.2	20.	8.7	.....	.....	1.48	.36	.....	.....	.69	.....	.....	.1	1.3
3077	" 20	" 21	d	c	.1	702.	680.	22.	68.	56.	38.	8.7	.....	.....	2.	.36	.....	.....	1.01	.....	.....	.065	1.05
3107	" 28	" 30	d	c	.04	621.2	608.8	12.4	37.6	33.6	41.	8.5	.....	.....	4.8	.6	.....	.....	1.17	.....	.....	.2	.75
Average Jan. 4—June 29						340.5	334.4	6.0	31.5	24.4	9.4	11.9	.....	.....	.272	.45	.....	.....	.92	.....	.....	.022	1.27
Average July 5—Dec. 28						570.6	561.9	8.6	43.8	34.4	25.9	10.1	.....	.....	1.171	.47	.....	.....	.93	.....	.....	.111	.42
Average Jan. 4—Dec. 28						459.5	448.2	11.3	37.6	29.4	17.6	11.	.....	.....	.722	.46	.....	.....	.92	.....	.....	.067	.84

There was no perceptible odor. The color upon ignition was brown.

CHEMICAL EXAMINATION OF WATER FROM THE DESPLAINES RIVER AT LOCKPORT.

(Parts per 1,000,000.)

Serial Number.	1898. Date of Collection.	1898. Date of Examination.	Appearance. Turbidity.	Appearance. Sediment.	Appearance. Color.	Residue on Evaporation. Total.	Residue on Evaporation. Dissolved.	Residue on Evaporation. Suspended.	Residue on Evaporation. Loss on Ignition. Total.	Residue on Evaporation. Loss on Ignition. Dissolved.	Chlorine.	Oxygen Consumed. Total.	Oxygen Consumed. By Dissolved.	Oxygen Consumed. By Suspended Matt'r	Nitrogen as Ammonia. Free Ammonia.	Nitrogen as Ammonia. Albuminoid Ammonia. Total.	Nitrogen as Ammonia. Albuminoid Ammonia. Dissolved.	Nitrogen as Ammonia. Albuminoid Ammonia. Suspended	Organic Nitrogen. Total.	Organic Nitrogen. Dissolved.	Organic Nitrogen. Suspended	Nitrogen as Nitrites.	Nitrogen as Nitrates.
3117	Jan. 1	Jan. 3	d	c	.08	772.8	762.8	10.	70.8	60.	41.	7.5	.....	.....	1.6	.36	.....	.....	.85	.....	.....	.2	1.2
3151	" 10	" 11	d	c	.04	629.2	621.6	7.6	32.	31.2	21.	5.2	.....	.....	1.6	.32	.....	.....	.84	.....	.....	.045	1.1
3181	" 18	" 20	d	l	.2	696.	686.4	9.6	64.8	46.8	31.	6.7	.....	.....	.88	.24	.....	.....	.84	.....	.....	.04	1.2
3209	" 24	" 26	d	c	.2	548.8	542.	6.8	150.	48.8	19.	7.8	.....	.....	.88	.32	.....	.....	.68	.....	.....	.06	1.75
3223	" 31	Feb. 1	d	c	.6	530.	509.2	20.8	160.	34.	29.	9.	.....	.....	.56	.48	.....	.....	.84	.....	.....	.125	2.25
3248	Feb. 8	" 9	d	c	.08	860.8	841.2	19.6	104.8	98.	60.	8.8	.....	.....	.7	.4	.....	.....	.76	.....	.....	.07	.9
3296	" 21	" 23	d	l	.4	438.8	423.2	15.6	56.4	36.	18.	10.9	.....	.....	.48	.32	.....	.....	.84	.....	.....	.025	.7
3307	" 28	Mar. 1	d	l	.3	396.	388.	8.	37.2	32.	11.	9.2	.....	.....	.44	.44	.....	.....	.92	.....	.....	.022	1.1
8331	Mar. 7	" 8	d	c	.25	555.6	543.2	12.4	54.8	44.8	25.	9.4	.....	.....	1.68	.6	.....	.....	1.32	.....	.....	.03	1.5
3355	" 14	" 15	d	c	....	516.	469.2	46.8	60.8	40.	94.	11.1	.....	.....	.56	.44	.....	.....	1.	.....	.....	.03	.85
3379	" 21	" 22	vd	c	.15	550.	461.2	88.8	62.8	54.4	126.	21.	.....	.....	.6	.8	.....	.....	1.4	.....	.....	.055	.8
3407	" 26	" 30	d	c	.5	395.2	375.2	20.	52.	36.	12.	12.6	.....	.....	.2	.44	.....	.....	2.4	.....	.....	.03	1.05
3422	Apr. 4	Apr. 5	d	l	.4	523.6	519.6	4.	48.	39.2	12.	9.5	.....	.....	.152	.44	.....	.....	.93	.....	.....	.03	1.
3447	" 11	" 12	d	l	.08	665.6	632.4	33.2	73.2	68.4	16.	9.1	.....	.....	.56	.44	.....	.....	.85	.....	.....	.03	.7
3472	" 18	" 20	d	l	.15	628.4	625.2	3.2	69.6	68.8	37.	9.2	.....	.....	.72	.44	.....	.....	1.01	.....	.....	.034	1.25
3494	" 25	" 26	s	l	.05	620.4	616.	4.4	62.	60.	33.	7.6	.....	.....	.36	.4	.....	.....	.77	.....	.....	.03	1.4
3529	May 2	May 3	d	c	.05	612.8	567.2	45.6	76.8	66.	18.	11.8	.....	.....	.24	.56	.....	.....	1.26	.....	.....	.04	.4
3352	" 9	" 10	d	l	.06	736.8	724.	12.8	78.4	72.8	18.	8.3	.....	.....	.52	.48	.....	.....	.74	.....	.....	.045	.4
3680	" 16	" 17	d	c	.06	724.	720.4	3.6	82.	72.	36.	8.7	.....	.....	.112	.64	.....	.....	1.14	.....	.....	.001	1.5
3612	" 23	" 24	d	c	.1	697.6	674.	23.6	72.	66.8	15.	11.	.....	.....	.2	.44	.....	.....	1.06	.....	.....	.02	.4
3633	" 30	" 31	d	l	.04	750.4	709.2	41.2	80.8	78.	35.	8.3	.....	.....	.16	.36	.....	.....	.74	.....	.....	.014	.8
3658	June 6	June 7	d	l	.04	480.	475.2	4.8	48.	42.8	8.	13.	.....	.....	.056	.4	.....	.....	.76	.....	.....	.003	.3
3682	" 13	" 14	d	l	.03	585.6	562.4	23.2	51.2	22.	10.	8.3	8.2	.1	.072	.32	.32	0.0	.68	.6	.08	.003	.3
3702	" 20	" 21	s	l	.02	725.2	724.	1.2	57.2	54.8	16.	7.8	7.3	.5	.08	.36	.32	.04	.96	.....	.....	.016	.4
3748	" 27	" 28	d	c	.2	386.	303.2	82.8	33.6	32.	14.	15.5	.....	.....	.76	.64	.....	.....	1.16	.....	.....	.034	.3
3770	July 2	July 4	d	l	.7	356.	336.	20.	25.6	25.2	16.	14.	.....	.....	.56	.48	.....	.....	.92	.....	.....	.1	.35
3811	" 11	" 12	d	c	.05	709.6	693.6	16.	48.4	45.2	19.	9.	.....	.....	.16	.48	.....	.....	.96	.....	.....	.03	.25

CHEMICAL EXAMINATION OF WATER FROM THE DESPLAINES RIVER AT LOCKPORT.—CONTINUED.
(Parts per 1,000,000.)

Serial Number.	1898 Date of Collection.	1898 Date of Examination.	Appearance. Turbidity.	Appearance. Sediment.	Appearance. Color.	Residue on Evaporation. Total.	Residue on Evaporation. Dissolved.	Residue on Evaporation. Suspended.	Residue on Evaporation. Loss on Ignition. Total.	Residue on Evaporation. Loss on Ignition. Dissolved	Chlorine.	Oxygen Consumed. Total.	Oxygen Consumed. By Dissolved.	Oxygen Consumed. By Suspended Matt'r	Nitrogen as Ammonia. Free Ammonia.	Nitrogen as Ammonia. Albuminoid Ammonia. Total.	Nitrogen as Ammonia. Albuminoid Ammonia. Dissolved	Nitrogen as Ammonia. Albuminoid Ammonia. Suspended	Organic Nitrogen. Total.	Organic Nitrogen. Dissolved	Organic Nitrogen. Suspended	Nitrogen as Nitrites.	Nitrogen as Nitrates.
3837	July 18	July 19	d	1	.04	843.2	832.4	10.8	56.	52.	20.	8.1	.....	.....	.104	.44	.....	.....	.88	.....	.....	.07	.25
3883	" 26	" 27	d	1	.04	788.	784.4	3.6	46.	45.2	22.	9.	.....	.....	.176	.36	.....	.....	.84	.....	.....	.12	.1
3902	Aug. 1	Aug. 2	d	1	.03	765.6	752.	13.6	60.	58.	41.	8.3	.....	.....	.136	.36	.....	.....	.88	.....	.....	.09	.25
3931	" 8	" 9	d	1	.04	573.2	562.	11.2	50.	47.2	21.	9.	.....	.....	.048	.48	.....	.....	.8	.....	.....	.16	.15
3957	" 14	" 16	s	1	.03	722.8	706.	16.8	80.	78.	25.	7.3	.....	.....	.12	.32	.....	.....	.68	.....	.....	.15	.25
3986	" 22	" 24	d	1	.05	699.2	693.2	6.	40.	38.	16.	7.5	.....	.....	.16	.32	.....	.....	.64	.....	.....	.026	.1
4008	" 29	" 30	d	1	.1	384.8	381.2	3.6	44.8	39.2	10.	9.5	.....	.....	.032	.52	.....	.....	.....	.....	.....	none	.05
4040	Sept. 4	Sept. 7	d	1	.06	390.	389.2	.8	35.2	34.	11.	12.7	.....	.....	.064	.56	.....	.....	.72	.....	.....	.001	.05
4062	" 10	" 12	d	1	.1	355.2	354.8	.4	40.	40.	11.	8.7	.....	.....	.032	.36	.....	.....	.6	.....	.....	none	.2
4089	" 19	" 20	d	1	.05	374.4	362.4	12.	38.	32.8	10.	8.	.....	.....	.028	.44	.....	.....	.6	.....	.....	.001	.1
4130	" 26	" 28	d	1	.06	385.2	382.8	2.4	73.2	72.	12.	7.8	.....	.....	.02	.36	.....	.....	.52	.....	.....	none	.15
4171	Oct. 3	Oct. 5	s	1	.05	380.8	379.2	1.6	43.2	39.2	11.	7.7	.....	.....	.03?	.36	.....	.....	.56	.....	.....	none	.5
4189	" 10	" 11	d	c	....	397.6	375.6	22.	28.8	26.8	15.	9.8	.....	.....	.022	.44	.....	.....	.6	.....	.....	.008	.5
4220	" 18	" 19	d	1	.06	390.8	376.	14.8	40.	34.	12.	8.	.....	.....	.006	.32	.....	.....	.61	.....	.....	none	.2
4255	" 24	" 26	d	1	.1	434.8	424.	10.8	50.	42.	11.	7.7	.....	.....	.01	.288	.....	.....	.61	.....	.....	.01	.25
4303	" 31	Nov. 2	d	1	.2	442.8	441.2	1.6	38.	36.	7.	8.	.....	.....	.02	.26	.....	.....	.61	.....	.....	.012	.4
4328	Nov. 7	" 8	d	1	.2	454.	450.8	3.2	38.	36.	8.	8.	.....	.....	.01	.28	.....	.....	.63	.....	.....	.012	.5
4363	" 14	" 15	d	1	.7	326.8	320.	6.8	30.	28.	7.	9.	.....	.....	.014	.36	.....	.....	.67	.....	.....	.015	.55
4404	" 21	" 23	d	1	.15	402.8	398.	4.8	40.	38.	6.	8.1	.....	.....	.016	.28	.....	.....	.59	.....	.....	.01	.6
4424	" 28	" 28	d	1	.06	482.	461.6	20.4	50.	35.6	6.	7.7	.....	.....	.03	.256	.....	.....	.59	.....	.....	.004	.5
4458	Dec. 6	Dec. 7	s	1	.04	560.	542.8	17.2	48.	46.8	6.6	7.5	.....	.....	.03	.256	.....	.....	.61	.....	.....	.001	.2
4477	" 12	" 13	s	1	.05	707.2	704.8	2.4	65.2	64.	10.	8.	.....	.....	.01	.292	.....	.....	.65	.....	.....	.001	.3
4507	" 19	" 21	s	1	.05	496.8	490.	6.8	60.	59.2	7.5	8.5	.....	.....	.002	.336	.....	.....	.65	.....	.....	.005	.2
4538	" 26	" 28	d	1	....	342.	335.6	8.4	44.	40.	8.5	15.	.....	.....	.056	.52	.....	.....	.85	.....	.....	.017	.25
Average Jan. 1–June 27						605.	539.	66.	61.5	52.2	30.2	9.9	.....	.....	.566	.443	.....	.....	.99	.....	.....	.041	.94
Average July 2–Dec. 26						506.3	493.4	12.9	46.6	43.5	13.4	8.9	.....	.....	.073	.374	.....	.....	.664	.....	.....	.032	.27
Average Jan. 1–Dec. 26						554.7	319.6	35.	53.9	47.8	21.6	9.4	.....	.....	.315	.408	.....	.....	.824	.....	.....	.036	.6

Chemical Examination of Water from the Desplaines River at Lockport.
(Part per 1,000,000.)

Serial Number.	1899 Date of Collection.	1899 Date of Examination	Appearance: Turbidity.	Appearance: Sediment.	Appearance: Color.	Residue on Evaporation: Total.	Residue on Evaporation: Dissolved.	Residue on Evaporation: Suspended.	Loss on Ignition: Total.	Loss on Ignition: Dissolved.	Chlorine.	Oxygen Consumed: Total.	Oxygen Consumed: By Dissolved.	Oxygen Consumed: By Suspended Matt'r	Nitrogen as Ammonia: Free Ammonia.	Albuminoid Ammonia: Total.	Albuminoid Ammonia: Dissolved.	Albuminoid Ammonia: Suspended	Organic Nitrogen: Total.	Organic Nitrogen: Dissolved.	Organic Nitrogen: Suspended	Nitrogen as Nitrites.	Nitrogen as Nitrates.
4564	Jan. 2	Jan. 4	d	1	.1	373.2	360.8	12.4	49.6	44.	7.5	13.	......	......	.184	.36	......	......	.77	......	......	.008	.2
4598	" 9	" 11	d	1	.4	380.	377.6	2.4	26.8	24.8	7.8	9.6	......	......	.26	.36	......	......	.69	......	......	.007	.2
4624	" 18	" 20	d	1	.3	348.	346.8	1.2	60.	58.	7.2	8.8	......	......	.21	.32	......	......	.65	......	......	.005	.55
4644	" 24	" 25	d	1	.4	318.8	316.8	2.	40.	40.	5.8	7.8	......	......	.152	.36	......	......	.57	......	......	.006	.3
4660	" 30	" 31	d	1	.1	472.8	468.8	4.	62.	58.	8.7	12.5	......	......	.066	.36	......	......	.77	......	......	.002	.5
4679	Feb. 6	Feb. 7	s	1	.1	544.8	540.	4.8	80.	79.2	10.	9.	......	......	.04	.36	......	......	.57	......	......	.003	1.
4721	" 11	" 20	s	1	.15	916.8	912.	4.8	126.	112.	15.5	13.4	......	......	.14	.52	......	......	.9	......	......	.005	1.4
4725	" 20	" 21	d	1	.05	230.	228.	2.	28.	24.	3.5	7.7	......	......	.236	.36	......	......	.58	......	......	.012	.25
4753	" 27	" 28	d	c	......	284.	196.	88.	54.	44.	5.	18.8	......	......	.64	.68	......	......	1.14	......	......	.013	.4
4776	Mar. 6	Mar. 7	d	m	1.2	206.	179.2	26.8	56.	49.2	4.2	23.8	......	......	.4	.76	......	......	1.38	......	......	.045	.65
4803	" 13	" 14	d	m	......	255.2	220.	35.2	46.	42.	5.	21.	......	......	.44	.68	......	......	1.38	......	......	.02	.1
4838	" 20	" 22	d	m	.5	422.	192.	230.	68.	46.	4.	31.5	17.5	14.	.32	1.	.56	.44	2.87	.95	1.92	.05	.95
4860	" 27	" 29	d	m	......	276.	210.	66.	50.	44.	3.5	17.5	......	......	.32	.6	......	......	1.2	......	......	.023	.55
4888	Apr. 3	Apr. 4	d	m	......	224.	189.2	34.8	42.	40.	3.1	16.	......	......	.25	.48	......	......	.91	......	......	.012	.55
4913	" 10	" 11	d	1	.3	258.8	244.	14.8	42.	30.	4.2	14.2	......	......	.072	.44	......	......	.75	......	......	.014	.4
4938	" 17	" 18	d	1	.4	346.	332.8	13.2	52.	48.	6.4	14.6	......	......	.04	.52	......	......	.99	......	......	.002	.2
4962	" 24	" 26	d	1	.3	400.	386.8	13.2	68.	54.	6.	14.5	......	......	.048	.64	......	......	.81	......	......	.001	.2
5071	May 22	May 23	d	1	.03*.04	369.6	350.8	18.8	27.6	13.6	3.9	15.2	15.	.2	.016	.512	.448	.064	1.21	1.05	.16	.026	.24
5119	" 29	" 31	d	1	.3	375.6	353.6	22.	38.	36.	1.5	17.	14.	3.	.132	.72	.416	.304	1.21	.97	.24	.027	.4
5157	June 5	June 6	d	c	.6	300.	264.4	35.6	36.	26.	2.5	16.7	14.5	2.2	.204	.48	.416	.064	1.29	.89	.4	.07	.48
5203	" 12	" 14	d	c	.5	439.2	358.	81.2	67.2	36.8	3.4	18.3	15.4	2.9	.144	.768	.704	.064	1.16	1.016	.144	.021	.44
5247	" 19	" 21	d	c	.2	418.4	405.2	13.2	56.	52.8	2.5	16.2	13.4	2.8	.144	.544	.448	.096	1.24	1.016	.224	.002	.36
5290	" 26	" 27	d	1	.2*.25	391.6	352.	39.6	35.6	34.	5.5	15.8	14.3	1.5	.06	.544	.48	.064	1.16	.952	.208	.001	.12
5330	July 3	July 4	d	1	.2*.3	383.6	369.2	14.4	39.6	38.8	7.3	15.2	15.	.2	.08	.544	.496	.048	1.176	1.112	.064	.001	.16
5388	" 10	" 11	d	1	.4	349.6	342.8	6.8	38.8	36.	6.4	13.7	12.6	1.1	.04	.448	.4	.048	1.08	.76	.32	.008	.4
5435	" 17	" 18	d	c	.5	271.6	194.8	76.8	45.2	40.	3.2	15.3	11.6	3.7	.128	.544	.32	.224	1.24	.824	.416	.03	.52
5482	" 24	" 25	d	c	.4	309.6	284.4	25.2	49.2	48.4	4.1	15.	13.4	1.6	.068	.544	.416	.128	1.24	.92	.32	.012	.36

* n.f.

CHEMICAL EXAMINATION OF WATER FROM THE DESPLAINES RIVER AT LOCKPORT.—CONTINUED.
(Part per 1,000,000.)

Serial Number.	1899 Date of Collection.	1899 Date of Examination.	Appearance. Turbidity.	Appearance. Sediment.	Appearance. Color.	Residue on Evaporation. Total.	Residue on Evaporation. Dissolved.	Residue on Evaporation. Suspended.	Loss on Ignition. Total.	Loss on Ignition. Dissolved.	Chlorine.	Oxygen Consumed. Total.	Oxygen Consumed. By Dissolved.	Oxygen Consumed. By Suspended Matt'r.	Nitrogen as Ammonia. Free Ammonia.	Albuminoid Ammonia. Total.	Albuminoid Ammonia. Dissolved.	Albuminoid Ammonia. Suspended	Organic Nitrogen. Total.	Organic Nitrogen. Dissolved.	Organic Nitrogen. Suspended	Nitrogen as Nitrites.	Nitrogen as Nitrates.
5531	July 31	Aug. 1	d	1	.2	331.2	325.6	5.6	61.2	59.2	5.7	15.5	14.5	1.	.028	.512	.448	.064	.888	.782	.106	.011	.2
5578	Aug. 7	" 8	d	1	.4	338.	324.8	13.2	72.8	70.4	6.8	14.3	13.4	.9	.02	.48	.416	.064	1.16	.856	.304	.002	.2
5627	" 14	" 15	d	1	.15*.2	302.	297.2	4.8	78.4	73.2	7.2	12.8	12.7	.1	.044	.48	.368	.112	1.16	.856	.304	none	.2
5675	" 21	" 22	s	1	.15*.2	345.8	343.6	3.2	68.4	....	10.4	13.7	13.1	.6	.032	.448	.416	.032	1.16	1.08	.08	.002	.16
5732	" 28	" 29	d	1	.25	316.8	313.6	3.2	46.4	46.	9.2	13.7	13.1	.6	.04	.512	.464	.048	.92	.84	.08	.003	.08
5789	Sept. 4	Sept. 5	d	1	.15	310.4	302.4	8.	50.	49.2	8.6	13.1	13.	.1	.092	.576	.416	.16	1.112	.824	.288	.005	.16
5836	" 11	" 12	s	1	.08*.25	300.8	298.8	2.	67.6	66.	8.5	12.6	12.6	0.0	.06	.512	.432	.08	1.16	.888	.272	.001	.12
5883	" 18	" 19	d	1	.05*.06	289.2	288.8	.4	46.	45.6	8.8	8.9	....	....	.062	.512	.432	.08	1.24	.924	.316	.003	.32
5937	" 25	" 26	d	1	.04	304.	304.	0.0	27.2	26.8	7.4	9.6	8.8	.8	.024	.404	.34	.064	.868	.74	.128	.001	.16
5985	Oct. 2	Oct. 3	d	1	.07*.2	315.2	312.8	2.4	54.4	52.8	7.7	10.	....	....	.054	.448	.416	.032	.82	.612	.208	.002	.12
6036	" 9	" 11	d	1	.1*.15	352.8	343.6	9.2	43.2	41.6	7.9	9.3	9.1	.2	.032	.392	.332	.06	.772	.664	.108	.001	.2
6078	" 16	" 17	d	1	.1	360.4	351.6	8.8	35.6	34.8	9.6	13.1	12.5	.6	.232	.32	.288	.032	.904	.808	.096	none	.16
6145	" 23	" 24	s	1	.15	355.2	351.2	4.	26.	18.	8.4	7.9	7.7	.2	.028	.352	.32	.032	.76	.52	.24	none	.12
6194	" 30	" 31	s	1	.25	406.	397.2	8.8	24.8	22.	8.5	8.1	7.7	.4	.024	.368	.32	.048	.648	.424	.224	.002	.08
6242	Nov. 6	Nov. 7	d	1	.08*.15	438.8	433.	5.8	36.	23.5	12.3	8.1	7.2	.9	.104	.48	.256	.224	.904	.632	.272	.001	.24
6280	" 13	" 14	s	1	.03*.05	475.6	469.2	6.4	47.6	45.2	15.	7.1	7.1	0.0	.06	.512	.288	.224	1.	.584	.416	.006	.4
6337	" 20	" 21	s	1	.03*.04	438.4	428.4	10.	19.6	19.2	18.	6.7	6.6	.1	.032	.432	.32	.112	.744	.584	.16	.001	.28
6399	" 27	" 28	s	1	.02*.04	450.4	446.8	3.6	32.8	31.6	18.5	6.3	....	....	.028	.224	.192	.032	.616	.488	.128	.006	.48
6447	Dec. 4	Dec. 6	s	1	.02*.03	444.	440.	4.	50.	48.4	15.	5.3	5.3	0.0	.044	.208	.192	.016	.68	.552	.128	.001	.32
6495	" 11	" 13	d	1	.1*.15	377.2	344.8	32.4	36.4	30.4	11.	7.8	4.9	2.9	.048	.32	.16	.16	.68	.424	.256	.003	.32
6544	" 18	" 20	d	1	.03	431.6	421.6	10.	40.	38	13.7	8.2	8.2	0.0	.34	.368	.352	.016	.776	.68	.096	.003	1.04
6582	" 26	" 27	d	1	.04*.05	538.	514.	24.	65.2	56.4	12.7	8.9	8.9	0.0	.152	.272	.256	.016	.776	.584	.192	.003	.72
Average Jan. 2–June 26						371.7	338.4	33.3	52.6	45.	5.5	15.3	14.9	3.8	.192	.537	.496	.156	1.059	.977	.145	.016	.45
Average July 3–Dec. 26						366.8	355.5	11.3	46.2	42.4	9.2	10.7	10.4	.7	.073	.431	.346	.083	.941	.728	.212	.004	.29
Average Jan. 2–Dec. 26						369.1	347.5	21.6	49.2	43.7	7.7	12.9	11.4	1.4	.129	.481	.379	.985	.997	.782	.262	.01	.36

*n.f.

CHEMICAL EXAMINATION OF WATER FROM THE CHICAGO SANITARY CANAL AT LOCKPORT.
(Parts per 1,000,000.)

Serial Number.	1900 Date of Collection.	1900 Date of Examination.	Appearance: Turbidity.	Appearance: Sediment.	Appearance: Color.	Residue on Evaporation: Total.	Residue on Evaporation: Dissolved.	Residue on Evaporation: Suspended.	Residue on Evaporation: Loss on Ignition: Total.	Residue on Evaporation: Loss on Ignition: Dissolved.	Chlorine.	Oxygen Consumed: Total.	Oxygen Consumed: By Dissolved.	Oxygen Consumed: By Suspended Matt'r	Nitrogen as Ammonia: Free Ammonia.	Nitrogen as Ammonia: Albuminoid Ammonia: Total.	Nitrogen as Ammonia: Albuminoid Ammonia: Dissolved.	Nitrogen as Ammonia: Albuminoid Ammonia: Suspended	Organic Nitrogen: Total.	Organic Nitrogen: Dissolved.	Organic Nitrogen: Suspended	Nitrogen as Nitrites.	Nitrogen as Nitrates.
7895	July 9	July 10	d	1	.2	272.4	255.2	17.2	44.4	32.8	24.	9.5	7.5	2.	2.08	.68	.176	.504	1.092	.42	.672	.004	.04
7923	" 11	" 14	vs	1	.01	192.8	178.	14.8	15.6	14.4	12.	5.	4.3	.7	1.36	.256	.176	.08	.76	.42	.34	.034	.12
7939	" 16	" 17	d	1	.02	210.4	190.	20.4	22.4	11.6	16.	7.4	4.3	3.1	1.52	.368	.272	.096	.6	.452	.148	.001	.2
7981	" 18	" 19	s	1	.02	176.8	162.	14.8	17.2	14.	12.	5.2	4.2	1.	1.	.324	.16	.164	....	....	....	.005	.16
7993	" 20	" 21	d	1	.02	176.8	160.4	16.4	17.6	11.6	14.	5.4	4.	1.4	1.04	.208	.176	.032	.68	.54	.14	none	.04
8007	" 23	" 24	d	1	.01	190.	164.4	25.6	26.8	18.8	12.	5.7	5.3	.4	1.32	.272	.144	.128	.68	.42	.26	.001	.12
8023	" 25	" 26	d	1	.04	164.4	156.	8.4	19.6	19.6	10.	5.5	4.8	.7	1.36	.272	.112	.16	.68	.392	.288	.007	.2
8045	" 27	" 28	d	m	.01	257.2	208.	49.2	40.4	30.4	19.	7.5	6.1	1.4	2.44	.368	.208	.16	.8	.6	.2	.001	.16
8058	" 30	" 31	d	1	.01	197.2	176.8	20.4	19.6	18.8	15.	5.6	5.4	.2	1.2	.48	.176	.304	1.16	.52	.64	†	.08
8082	Aug. 1	Aug. 2	d	1	.01	197.2	157.6	39.6	35.2	19.2	13.	5.8	5.5	.3	1.6	.288	.192	.096	.76	.44	.32	†	.28
8114	" 6	" 8	d	1	.01	198.	180.8	17.2	36.8	30.	16.	7.5	4.9	2.6	1.88	.352	.256	.096	.84	.712	.128	.001	.52
8136	" 8	" 9	d	1	.01	192.8	174.	18.8	37.6	28.4	14.	6.1	5.3	.8	1.44	.448	.192	.256	1.12	.68	.44	.001	.16
8155	" 10	" 13	d	1	.01	171.2	166.8	4.4	32.4	29.2	16.	6.	4.2	1.8	1.92	.304	.176	.128	.76	.284	.476	†	.2
8174	" 13	" 15	d	1	.01	154.4	154.	.4	29.2	22.4	14.	4.6	3.8	.8	1.36	.272	.176	.096	1.	.504	.496	.001	.28
8192	" 15	" 16	d	1	.01	178.4	165.2	13.2	30.8	26.4	13.	11.		6.6	2.88	.992	.144	.848	2.52	.33	.216	†	.2
8216	" 17	" 18	d	1	.01	218.	188.8	29.2	41.2	31.6	20.	8.	5.	3.	2.16	.368	.16	.208	.76	.348	.412	.001	.36
8232	" 20	" 21	d	1	.02	218.8	209.2	9.6	32.8	22.	25.	14.9	5.1	9.8	2.	.688	.176	.512	1.4	.284	1.116	†	.2
8264	" 22	" 23	d	1	....	200.8	174.8	26.	12.8	10.4	16.	7.1	3.4	3.7	1.84	.384	.112	.272	.94	.22	.72	†	.16
8281	" 24	" 25	d	1	.02	230.	205.2	24.8	30.8	17.6	22.	7.7	4.	3.7	2.4	.368	.112	.256	1.	.3	.7	.004	.16
8308	" 27	" 28	d	1	.02	221.6	217.6	4.	20.4	18.8	23.	11.2	4.5	6.7	2.08	.432	.08	.352	1.16	.268	.892	.001	.16
8335	" 29	" 31	d	1	.02	202.4	180.4	22.	19.2	16.4	15.	5.7	4.	1.7	2.08	.32	.16	.16	.76	.3	.46	.002	.24
8349	" 31	Sept. 3	s	1	.02	212.4	169.2	53.2	14.8	12.	15.	7.	3.9	3.1	1.336	.4	.208	.192	.6	.38	.22	.01	.16
8367	Sept. 3	" 5	s	1	.4	173.2	166.8	6.4	12.	10.4	12.	6.	3.	3.	.112	.208	.128	.08	.62	.22	.4	.007	.16
8388	" 5	" 6	s	1	.01*.04	179.2	173.6	5.6	17.6	13.2	14.	6.9	3.	3.9	1.28	.384	.16	.224	.62	.328	.292	.002	.24

* n. f. † trace.

CHEMICAL EXAMINATION OF WATER FROM THE CHICAGO SANITARY CANAL AT LOCKPORT.—CONTINUED.
(Parts per 1,000,000.)

Serial Number.	1900 Date of Collection.	1900 Date of Examination.	Appearance. Turbidity.	Appearance. Sediment.	Appearance. Color.	Residue on Evaporation. Total.	Residue on Evaporation. Dissolved.	Residue on Evaporation. Suspended.	Residue on Evaporation. Loss on Ignition. Total.	Residue on Evaporation. Loss on Ignition. Dissolved.	Chlorine.	Oxygen Consumed. Total.	Oxygen Consumed. By Dissolved.	Oxygen Consumed. By Suspended Matt'r	Nitrogen as Ammonia. Free Ammonia.	Nitrogen as Ammonia. Albuminoid Ammonia. Total.	Nitrogen as Ammonia. Albuminoid Ammonia. Dissolved.	Nitrogen as Ammonia. Albuminoid Ammonia. Suspended	Organic Nitrogen. Total.	Organic Nitrogen. Dissolved.	Organic Nitrogen. Suspended	Nitrogen as Nitrites.	Nitrogen as Nitrates.
8416	Sept. 7	Sept. 8	d	c	.1	206.4	192.8	13.6	38.4	13.2	17.	17.4	5.6	11.8	1.2	.64	.208	.432	1.4	.....	.....	.004	.2
8435	" 10	" 11	d	l	.04*.05	198.	180.4	17.6	19.2	17.2	19.	9.5	4.1	5.4	2.08	.544	.176	.368	1.212	.384	.828	.003	.16
8455	" 12	" 13	d	c	.1	200.	197.2	2.8	18.	16.8	19.	10.2	4.6	5.6	2.52	.652	.124	.528	3.1	.....	.....	.001	.16
8472	" 14	" 15	d	l	.2	216.4	215.2	1.2	22.4	22.	24.	10.6	8.4	2.2	2.8	.688	.208	.48	.62	.336	.284	none	.28
8490	" 17	" 19	d	l	.02	176.8	146.	30.8	14.8	13.2	13.	6.1	4.4	1.7	1.36	.32	.096	.224	.652	.32	.332	.012	.4
8522	" 21	" 22	s	l	.02*.02	199.2	194.4	4.8	19.6	18.4	17.	7.6	5.9	1.7	.192	.352	.124	.228	.6	.4	.2	.001	.8
8547	" 24	" 27	s	l	.02	168.4	166.8	1.6	24.	18.	10.	3.2	3.	.2	1.52	.144	.096	.048	.636	.384	.252	.007	.24
8565	" 26	" 28	d	l	.03*.03	200.8	177.2	23.6	24.8	20.	15.	6.3	3.9	2.4	1.76	.224	.096	.128	.572	.336	.236	.001	.28
8574	" 28	Oct. 1	d	l	.05	184.8	170.	14.8	16.4	13.6	12.	6.	3.8	2.2	.62	.48	.128	.352	.54	.352	.188	.002	.28
8593	Oct. 1	" 2	s	l	.05*.05	186.8	173.6	13.2	16.4	15.2	14.	6.5	5.6	.9	1.12	.544	.224	.32	.928	.496	.432	.001	.04
8615	" 3	" 4	s	l	.03*.05	168.8	164.8	4.	31.2	26.	11.	5.3	4.5	.8	1.12	.304	.272	.032	.592	.496	.096	.001	.16
8627	" 5	" 6	s	l	.01*.03	178.8	163.6	15.2	22.4	18.4	11.	5.5	4.	1.5	1.32	.24	.....	.....	.592	.272	.32	.001	.24
8674	" 15	" 17	s	l	.01*.02	175.6	169.6	6.	23.6	20.4	13.	8.2	6.5	1.7	.664	.608	.368	.24	1.28	.928	.252	.01	.23
8700	" 23	" 25	s	l	.02*.02	173.2	168.8	4.4	19.6	17.6	10.	5.7	5.	.7	.128	.208	.192	.016	.672	.56	.112	.023	.257
8724	" 29	" 31	s	l	.01*.02	170.4	151.6	18.8	15.6	12.8	9.	4.7	4.3	.4	1.36	.272	.096	.176	.672	.56	.112	.001	.24
8762	Nov. 5	Nov. 10	s	v	.02*.02	169.2	168.4	.8	18.8	17.2	10.	5.3	4.6	.7	1.36	.256	.144	.112	.608	.496	.112	.01	.27
8773	" 12	" 13	d	l	.01	177.2	157.2	20.	10.4	10.	10.	5.5	4.4	1.1	1.524	.32	.272	.048	.816	.624	.192	.007	.193
8792	" 19	" 20	d	l	.02	194.8	160.4	34.4	18.	15.6	10.	6.3	4.9	1.4	.96	.48	.24	.48	1.552	.704	.848	.018	.342
8830	" 26	" 27	d	l	.03	188.8	167.6	21.2	18.	16.8	10.5	5.3	4.4	.9	1.056	.368	.192	.176	.976	.656	.32	.036	.204
8888	Dec. 11	Dec. 12	d	l	.1	182.8	166.4	16.4	13.6	12.4	9.	6.9	5.7	1.2	1.024	.272	.128	.144	.848	.384	.464	.019	.141
8908	" 18	" 21	d	l	....	175.6	164.	11.6	22.4	20.	9.	6.6	6.2	.4	.96	.336	.144	.192	.944	.416	.428	.013	.107
8924	" 26	" 27	d	l	.02	198.	177.2	20.8	26.4	20.8	16.	8.	6.7	1.3	1.49	.448	.32	.128	1.264	.528	.736	.016	.384
Average July 9—Dec. 26............						206.4	189.	17.4	25.4	17.5	15.6	7.2	5.1	2.1	1.599	.421	.183	.238	.985	.442	.543	.006	.258

*n.f. The water was invariably possessed of the characteristic musty odor of diluted sewage. The residue upon ignition was always either dark gray or brown.

CHEMICAL EXAMINATION OF WATER FROM THE ILLINOIS RIVER AT MORRIS.
(Parts per 1,000,000.)

Serial Number.	1897. Date of		Appearance.			Residue on Evaporation.					Chlorine.	Oxygen Consumed.			Nitrogen as Ammonia				Organic Nitrogen.			Nitrogen as	
	Collection.	Examination.	Turbidity.	Sediment.	Color.	Total.	Dissolved.	Suspended.	Loss on Ignition. Total.	Loss on Ignition. Dissolved.		Total.	By Dissolved.	By Suspended Matt'r	Free Ammonia.	Albuminoid Ammonia. Total.	Albuminoid Ammonia. Dissolved.	Albuminoid Ammonia. Suspended	Total.	Dissolved.	Suspended	Nitrites.	Nitrates.
1803	Jan. 5	Jan. 7	7	m	.7	416.4	223.2	193.2	20	10.8	5.	25.7	11.8	13.9	.48	1.12	64	.48	2.08	.96	1.12	.035	3
1818	" 11	" 13	d	1	....	353.2	315.6	37.6	16.	16.	12.	15.1	....	....	.8	44	....	....	1.2	....	....	.09	3.5
1835	" 19	" 20	vd	m		387.2	241.2	146.	14.	12.	9.	18.5	....	....	.8	.76	....	....	1.6	....	....	.035	2.8
1852	" 26	" 28	d	1	.5	416.8	352.8	64.	16.8	9.2	21.	13.2	....	....	1.92	.72	....	....	1.44	....	....	.055	3.3
1872	Feb. 1	Feb. 3	d	1	..	389.2	383.6	5.6	8	8	25.	13.9	....	....	3 2	64	....	....	1.44	....	....	15	1.6
1896	" 8	" 10	d	1		375.2	363.2	12.	20.8	12	30.	12.6	....	....	3 4	.64	....	....	1.36	....	....	.115	1.4
1923	" 17	" 18	d	1	.2	322.8	306.8	16.	12.	4.8	18.	10.2	....	....	1.76	.44	....	....	1.16	....	....	04	1.7
1938	" 22	" 24	d	c	....	369.6	233.2	136.4	54.8	38.4	9.	13.9	....	....	.64	.52	....	....	1.36	....	....	.04	2.4
1965	Mar. 2	Mar. 4	d	1	.2	313.2	293.2	20	66.	54	17.	10.9	....	....	1.44	56	....	....	1	....	....	.06	1.7
1980	" 8	" 10	d	c	....	317.2	233.2	84.	48.	34.8	11.	13.6	....	....	.88	.52	....	....	1.07	....	....	.03	2.2
2019	" 16	" 18	d	c	...	306.	241.2	64.8	58.	56.	10.	13.4	....	....	.64	.48	....	....	1.15	....	....	.035	3.4
2042	" 23	" 25	vd	m	2	496.8	229.2	267.6	74.4	41.2	10.	24.9	8.9	16	.64	96	288	.672	2.11	.83	1.28	.15	3.
2063	" 30	Apr. 1	d	1	.5	295.2	238.8	56.4	54.8	40	10.	12.1	....	....	.56	.44	....	....	.91	....	....	.035	2.
2090	Apr. 5	" 6	d	c	...	238.	268	60	60.8	24.	13.	11.7	....	....	1.04	.6	....	....	1.23	....	....	065	1.7
2113	" 12	" 14	d	c	....	324.	262.4	61.6	52	34.8	15.	15.	....	....	1.76	.56	....	....	1.07	....	....	.08	1.4
2136	" 19	" 21	d	1	.4	356.	325.2	30.8	45.6	40.	19.	14.3	....	....	2.72	56	....	....	1.23	....	....	.095	1.4
2185	May 3	May 5	d	c	....	392.4	346.8	45.6	40.4	16.	23.	17.3	....	....	2	76	....	....	1.67	....	....	085	1.6
2215	" 13	" 15	d	1	.3	356.	343.6	12.4	32	31.2	24.	13.8	....	....	2.88	52	....	....	1.11	....	....	.14	1.
2233	" 17	" 20	d	c	.	350.	343.2	6.8	38	35.2	30.	16.3	....	....	3.6	.61	....	....	1.31	....	....	35	1.
2260	" 25	" 26	d	1	....	327.6	321.6	6.	24.2	18.8	28.	13	....	....	3.52	.52	....	....	1.15	....	....	.08	.7
2281	" 31	June 2	d	c	...	335.2	324.	11.2	35.2	31.	32.	15.2	....	....	3.6	52	....	....	1.15	....	....	06	1.6
2305	June 7	" 9	d	c	...	402.8	322.	80.8	40	30.8	41.	26.2	....	....	5.2	1.36	....	....	1.05	....	....	08	.4
2342	" 17	" 19	s	1	.3	328.	324.8	3.2	64.	08.	38.	16.4	....	....	5.	.6	....	....	.89	....	....	.17	.16
2361	" 21	" 23	d	m	...	417.2	256.8	160.4	32.	26.4	13.	19.5	....	....	1.28	.64	....	....	1.37	....	....	28	1.9
2386	" 28	" 30	d	c	..	353.6	333.2	20.4	56.	46.4	18.	17.2	....	....	2.	.52	....	....	1.05	....	....	.32	1.1
2426	July 6	July 8	d	1	.2	336.	323.6	12.4	20.	14.8	35.	14.6	....	....	4.	.52	....	....	1.16	....	....	.6	.6
2440	" 12	" 14	d	1	.2	321.6	304.8	16.8	20.	16.	42.	16.7	....	....	5.4	64	....	....	1.24	....	....	.25	.4

CHEMICAL EXAMINATION OF THE WATER OF THE ILLINOIS RIVER AT MORRIS.—CONTINUED.
(Parts per 1,000,000.)

Serial Number.	1897. Date of Collection.	1897. Date of Examination.	Appearance. Turbidity.	Appearance. Sediment.	Appearance. Color.	Residue on Evaporation. Total.	Residue on Evaporation. Dissolved.	Residue on Evaporation. Suspended.	Residue on Evaporation. Loss on Ignition. Total.	Residue on Evaporation. Loss on Ignition. Dissolved.	Chlorine.	Oxygen Consumed. Total.	Oxygen Consumed. By Dissolved.	Oxygen Consumed. By Suspended Matt'r	Nitrogen as Ammonia. Free Ammonia.	Nitrogen as Ammonia. Albuminoid Ammonia. Total.	Nitrogen as Ammonia. Albuminoid Ammonia. Dissolved.	Nitrogen as Ammonia. Albuminoid Ammonia. Suspended	Organic Nitrogen. Total.	Organic Nitrogen. Dissolved.	Organic Nitrogen. Suspended	Nitrogen as Nitrites.	Nitrogen as Nitrates.
2469	July 19	July 21	d	l	.5	328 8	322.	6.8	20.8	18.	36.	15.4	.....	.....	4.6	.64	.....	.....	1.08	.....	.....	.04	.4
2494	" 26	" 28	d	m	....	340.	304.	36.	22	13 2	45.	15.2	.....	.....	4.6	1 2	.....	.....	1.16	.....	.....	.65	1.6
2530	Aug. 3	Aug. 5	s	c	.3	348.4	342.	6.4	21.6	16 8	53.	15.3	.....	.....	5.4	.56	.....	.....	1.16	.....	.....	.75	1.
2547	" 9	" 11	d	c	.2	353.6	338.8	14.8	21.6	14.8	63.	13.1	.....	.....	7.	.6	.....	.....	1.08	.....	.....	.45	.45
2569	" 16	" 18	s	l	.2	380.	358.	22.	22.	19.2	77.	13.7	.....	.....	8.8	.6	.....	.....	1	.....	.....	6	.6
2590	" 24	" 25	d	l	.3	382.4	380.4	2.	25.2	17.2	82.	14.	.....	.....	12	.72	.....	.....	1.38	.....	.....	1.25	.3
2622	" 31	Sept. 2	d	c	.2	388.4	382.	6 4	38.	32.	75.	14.3	.....	.....	9.6	.96	.....	.....	1.7	.....	.....	.005	.05
2650	Sept 8	" 10	d	l	.5	390.	385.2	4.8	28.	27.2	84.	14.3	.....	.....	10.4	.88	.....	.....	1.46	.....	.....	.006	.6
2667	" 13	" 14	d	c	....	395.2	344.	51.2	26.	20.	87.	16.6	.....	.....	2.	1.08	.....	.....	1.86	.....	.....	.001	.1
2692	" 20	" 21	d	c	.15	405.6	400.	5.6	18.4	18.	92.	12.3	.....	.....	14.	.68	.....	.....	1.3	.....	.....	.065	.1
2719	" 27	" 28	d	c	.2	410.	405.6	4.4	26.	25.2	86.	15.5	.....	.....	12.	1.2	.....	.....	2.14	.....	.....	.01	.1
2754	Oct. 4	Oct. 5	d	c	....	404.	402.	2.	44.	40.	87.	9.	.....	.....	12.	1.6	.....	.....	2.54	.....	.....	.004	.1
2775	" 11	" 12	d	c	....	394.	384.8	9 2	32.	20.8	81.	16.9	.....	.....	1.6	1.16	.....	.....	2.38	.....	.....	.02	.4
2817	" 17	" 19	d	c	....	390.4	382.8	7.6	25.2	23.6	85.	16.	.....	.....	14.8	.92	.....	.....	1.82	.....	.....	.025	.05
2810	" 25	" 26	d	c	.15	400.	387.2	12.8	26.8	24.4	88.	17.5	.....	.....	10.8	1.2	.....	.....	2.14	.....	.....	none	.3
2874	Nov. 1	Nov. 2	d	c	....	404.4	392.4	12.	36.4	26.4	83.	22.5	.....	.....	11 6	1.28	.....	.....	2.62	.....	.....	.008	.1
2926	" 9	" 11	d	c	....	383.6	356.8	26.8	32.	20.	75.	16.8	.....	.....	12	1.12	.....	.....	1.98	.....	.....	.002	.45
2952	" 15	" 16	d	c	....	384.8	359.2	25.6	31 6	20.	74.	13.	.....	.....	9 4	.72	.....	.....	1.26	.....	.....	.013	.7
2976	" 22	" 23	d	c	....	420.	399.2	20.8	38.	30.	72.	16.4	.....	.....	9 2	1.32	.....	.....	1.98	.....	.....	.015	.45
3003	" 29	" 30	d	c	.3	405.6	384.8	20.8	28.	24.8	70.	13.6	.....	.....	9.	1.	.....	.....	1.85	.....	.....	.05	.45
3029	Dec. 7	Dec 8	d	c	....	410.8	396	14.8	48.	34.	60.	14.3	.....	.....	8.4	1.4	.....	.....	2.77	.....	.....	.04	.4
3056	" 13	" 14	d	c	....	387.2	362.8	24.4	38.4	30.	55.	15.3	.....	.....	8.	1.44	.....	.....	.245	.....	.....	.06	.4
3080	" 20	" 22	d	m	....	679.2	534.	145.2	60.	32.	92.	29.5	.....	.....	9.2	2.4	.....	.....	4.77	.....	.....	.06	.35
3098	" 27	" 29	d	c	....	451.2	436.8	14.4	34.	25.2	74.	26.5	.....	.....	8.	2.08	.....	.....	3.57	.....	.....	.006	.55
Average Jan. 5—June 28...........						361.1	297.1	34.1	39.3	29.1	19.	15.8	10.3	14.9	.7	.64	.46	.576	1.28	.89	1.2	.107	1.79
Average July 6—Dec. 27...........						395.9	375.7	20.2	30.1	23.2	71.	16.	.....	.....	9.36	1.07	.....	.....	1.91	.....	.....	.191	.42
Average Jan 5—Dec. 27...........						378.9	337.1	41.7	34.6	36.1	45.	15.9	10.3	14.9	5.78	.86	.46	.576	1.6	.89	1.2	.15	1.09

The odor was generally musty except when the river was high, then the water was usually odorless. The color upon ignition was uniformly brown.
* n. f.

CHEMICAL EXAMINATION OF WATER IN THE ILLINOIS RIVER AT MORRIS.

(Parts per 1,000,000.)

Serial Number.	1898. Date of		Appearance.			Residue on Evaporation.					Chlorine.	Oxygen Consumed.			Nitrogen as Ammonia				Organic Nitrogen.			Nitrogen as	
	Collection.	Examination.	Turbidity.	Sediment.	Color.	Total.	Dissolved.	Suspended.	Loss on Ignition. Total.	Loss on Ignition. Dissolved.		Total.	By Dissolved.	By Suspended Matt'r	Free Ammonia.	Albuminoid Ammonia. Total.	Albuminoid Ammonia. Dissolved.	Albuminoid Ammonia. Suspended	Total.	Dissolved.	Suspended	Nitrites.	Nitrates.
3128	Jan. 3	Jan. 5	d	c	.25	422.8	408.8	14.	36.8	18.8	42.	14.5	....	....	4.2	1.2	....	....	2.29	....	....	12	1.2
3153	" 10	" 11	d	m	....	432.8	400.	32.8	67.6	56.8	62.	24.4	....	....	6.4	1.92	....	....	4.36	....	....	.004	.8
3176	" 18	" 19	d	c	....	425.8	399.6	25.6	29.2	23.6	51.	23.5	....	....	5.6	2.	....	....	3.96	....	....	.28	.35
3208	" 24	" 26	d	c	....	442.	356.	86.	52.	40.	34.	17.	....	....	3.2	1.16	....	....	1.88	....	....	.2	2.35
3221	" 31	Feb. 1	d	c	....	418.	351.2	66.8	41.2	34.8	39.	15.4	....	....	3.4	1.28	....	....	2.2	....	....	.14	2.75
3250	Feb. 7	" 9	vd	m	....	589.6	476.	113.6	74.8	37.6	53.	38.	....	....	3.2	3.04	....	....	5.56	....	....	.04	.35
3264	" 14	" 15	d	m	....	420.	271.6	148.4	47.2	31.2	27.	23.4	....	....	2.	1.4	....	....	2.28	....	....	.065	2.5
3300	" 22	" 23	d	m	....	351.2	264.4	86.8	36.	27.2	15.	16.7	....	....	1.36	.88	....	....	1.64	....	....	.02	3.25
3318	Mar. 1	Mar. 2	d	c	.5	312.8	297.2	15.6	25.6	23.2	14.	13.6	....	....	12.8	.64	....	....	1.16	....	....	.04	2.5
3329	" 7	" 8	d	c	.3	359.6	340.4	19.2	40.4	34	27.	13.7	....	....	2.64	.76	....	....	1.64	....	....	.08	.8
3356	" 14	" 15	d	m		405.2	227.6	177.6	66.4	25.6	9.	24.	....	....	1.12	1.08	....	....	2.28	....	....	.075	1.2
3376	" 21	" 22	vd	vm	.1	684.2	236.	448.8	64.8	33.2	7.	35.7	....	....	.64	1.48	....	....	3.08	....	....	.03	6
3406	" 28	" 30	vd	vm	.6	697.2	181.2	516.	68	30.	4.8	38.	9.3	28.7	.368	1.76	.4	1.36	3.49	.77	2.72	.035	1.35
3432	Apr. 5	Apr 6	d	c	.25	272.	223.6	48.4	46.	32.4	6.	15.	....	....	.48	.68	....	...	1.25	....	...	.02	1.2
3450	" 12	" 13	d	1	.25	249.4	233.6	15.6	28.4	22.8	7.	15.	....	....	.088	.48	....	...	1.25	....	...	.025	.65
3480	" 19	" 21	d	1	.6	268.4	265.2	3.2	39.2	36.8	10.	15.6	....	....	.76	.52	....	...	1.17	....	...	.03	.7
3512	" 27	" 29	d	c	.3	306.4	300.4	6.	59.2	50	13.	13.8	....	....	1.28	.48	....	...	1.17	....	...	.035	.95
3536	May 2	May 4	d	c	.3	324.8	319.6	5.2	43.2	40	22.	12.7	....	....	2.64	.52	....	...	1.3	....	...	.045	.5
3555	" 9	" 11	d	1	.1	311.6	284.8	26.8	39.2	36.4	13.	12.8	....	....	1.44	.48	....	...	.98	....	...	.03	.75
3588	" 16	" 18	d	c	.3	314.4	286.8	27.6	46.8	40.	8.	12.8	....	....	.8	.52	....	...	.98	...	...	.025	.6
3613	" 24	May 25	vd	m		626.4	212.4	414.	62.	42.	10.	25.7	....	....	.92	.96	...	...	2.18	...	...	.07	1.

CHEMICAL EXAMINATION OF WATER IN THE ILLINOIS RIVER AT OTTAWA.—CONTINUED.
(Parts per 1,000,000.)

Serial Number.	1898. Date of		Appearance.			Residue on Evaporation.					Chlorine.	Oxygen Consumed.			Nitrogen as Ammonia				Organinc Nitrogen.			Nitrogen as	
									Loss on Ignition.							Albuminoid Ammonia.							
	Collec-tion.	Exami-nation.	Turbidity.	Sediment.	Color.	Total.	Dissolved.	Suspended.	Total.	Dis-solved		Total.	By Dis-solved.	By Suspended Matt'r	Free Ammonia.	Total.	Dis-solved	Sus-pended	Total.	Dissolved	Suspended	Nitrites.	Nitrates.
3641	May 31	June 2	d	c	...	341.2	289.6	51 6	32.8	27.2	14.	14.	....	....	1.52	.56	....	....	1.06	....	....	.115	.75
3666	June 6	" 8	d	l	.2	357.2	344.4	12.8	45.2	34.4	17.	13.2	....	....	2.16	.56	....	....	.96	....	....	.1	.8
3687	" 14	" 15	d	c	..	527.2	327.6	199.6	49.6	24.8	30.	16.7	....	....	2.8	.72	....	....	1.44	....	....	.09	.7
3714	" 20	" 22	d	c	.05	353.2	315.2	38.	21.2	20.	24.	10.6	....	....	2.56	.4	....	....	1.04	....	....	.07	.85
3762	" 28	" 30	d	c	...	440.4	400.	40 4	27.2	24.	67.	14.5	....	....	6.4	.44	....	....	1.16	....	....	.065	.25
3792	July 5	July 7	d	c	.2	346.	330 8	15.2	20.	18.8	36.	12.	....	....	3.8	.6	....	....	.88	....	....	.09	.35
3817	" 11	" 13	d	l	.2	372.8	354.	18.8	28.	22.	48.	12.2	....	....	6.	.56	....	....	1.16	....	....	.075	.3
3847	" 19	" 21	d	l	.04	370.8	364.8	6.	16.	14.4	60.	11.5	....	....	8.	.56	....	....	1.04	....	....	.017	.15
3865	" 23	" 25	d	c	.04	352.	347.6	4.4	27.2	26.	57.	10.5	....	....	7.6	.6	....	....	1.04	....	....	.105	.15
3892	" 30	Aug. 1	d	c	.05	379.6	371.6	8.	22.	18.4	77.	11.6	....	....	12.	.6	....	....	1.04	....	....	none	.35
3939	Aug. 8	" 10	vd	vm	...	2055 2	385.2	1670.	282.	33.2	81.	40.8	....	....	16.	20.	....	....	30.32	....	....	.035	.35
3977	" 22	" 23	d	c	.3	365 2	360.	5.2	28.	26.	65.	12.	....	....	7.2	.52	....	....	.88	....	....	.001	.15
4019	" 30	Sept. 1	d	c	.1	379.2	372.	7.2	26 8	23.2	67.	15.	....	....	9.6	1.	....	....	1.84	....	....	.001	.1
4052	Sept 6	" 7	d	l	.15	340 8	336 8	4.	29.6	24.4	65.	9.6	....	....	9.2	.56	....	....	.72	....	....	none	.05
4095	" 17	" 21	d	l	.08	335.2	328.	7.2	36.	24.	46.	8.2	....	....	6.	.44	....	....	.88	....	....	.04	.25
4115	" 24	" 26	d	c	.04	338.4	318.8	19.6	31.2	28.	58.	7.5	....	....	7.4	.4	....	....	.64	....	....	.05	.3
Average Jan. 3—June 28............						409.7	308.2	101.5	45.7	32.5	24.	18.9	....	....	2.279	.99	....	....	1.99	....	....	.07	1.14
Average July 5—Sept. 24...........						512.2	351.7	160.5	49.7	23.4	60.	13.7	....	....	8.436	2.34	....	....	3.67	....	....	.037	.31
Average Jan. 3—Sept. 24...........						440.2	304.9	135.3	46.9	29.8	34.7	17.3	....	....	4.109	1.39	....	....	2.49	....	....	.06	.89

The odor was generally musty except when the river was high, then the water was usually odorless. The color upon ignition was almost always brown, but occasionally gray.

*n. f.

CHEMICAL EXAMINATION OF WATER FROM THE ILLINOIS RIVER AT MORRIS.

(Parts per 1 000,000.)

Serial Number.	1899. Date of Collection.	Date of Examination.	Appearance. Turbidity.	Sediment.	Color.	Residue on Evaporation. Total.	Dissolved.	Suspended.	Loss on Ignition. Total.	Loss on Ignition. Dissolved.	Chlorine.	Oxygen Consumed. Total.	By Dissolved.	By Suspended Matt'r	Nitrogen as Ammonia. Free Ammonia.	Albuminoid Ammonia. Total.	Dissolved.	Suspended.	Organic Nitrogen. Total.	Dissolved.	Suspended	Nitrogen as Nitrites.	Nitrates.
5112	May 29	May 30	d	c	.4	445.2	419.2	26.	63.2	54.	44.2	19.2	15.05	4.15	8.8	.88	.544	.336	1.93	1.18	.75	.035	.44
5164	June 6	June 7	d	c	.25	402.8	324.8	78.	55.2	52.	32.	15.4	11.4	4.	3.6	.8	.544	.256	2.17	1.23	.94	.06	.64
5209	" 13	" 14	d	c	.5	427.2	420.4	6.8	39.6	34.4	43.5	19.1	15.2	3.9	5.6	.736	.624	.112	1.72	1.24	.48	.06	.44
5299	" 27	" 28	d	c	.25	372.4	355.6	16.8	27.2	24.4	48.	17.6	15.2	2.4	6.8	.672	.512	.16	1.4	.92	.48	.028	.24
5332	July 3	July 4	d	c	.2* 3	403.2	395.6	7.6	33.6	22.8	57.5	15.3	13.5	1.8	7.52	.672	.448	.224	1.72	1.144	.576	.011	.2
5393	" 11	" 12	d	c	....	451.6	445.2	6.4	47.6	40.4	71.	15.8	14.1	1.7	8.8	.768	.528	.24	1.88	1.08	.8	.03	.2
5428	" 17	" 18	d	c	.06	373.2	312.8	60.4	49.6	46.	37.	15.5	11.65	3.85	5.6	.8	.336	.464	1.8	.824	.976	.08	1.08
5484	" 25	" 26	d	l	.25	432.	422.4	9.6	55.6	52.8	58.	14.	12.3	1.7	7.04	.768	.48	.288	.268	1.48	1.2	.035	.24
5529	" 31	Aug. 1	d	c	.04	421.2	401.2	20.	64.4	54.	63.	17.3	14.2	3.1	7.68	.736	.448	.288	1.64	1.16	.48	.018	.2
5570	Aug. 7	" 8	d	l	.04	425.2	420.4	4.8	46.8	43.2	70.2	16.3	11.9	4.4	12.	.72	.48	.24	1.96	.996	.964	.002	.24
5624	" 14	" 15	d	l	.07	394.			54.	52.8	79.	16.3	13.3	3.	11.	.864	.448	.416	1.752	1.048	.704	.005	.28
5672	" 21	" 22	d	l	.15	398.4	395.6	2.8	39.6	38.	75.	15.5	13.	2.5	12.	.832	.48	.352	1.56	1.08	.48	.005	.12
5738	" 29	" 30	d	c	.08	446.4	440.4	6.	96.8	69.2	92.	14.7	12.7	2.	14.	.88	.464	.416	2.12	1.144	.976	.017	.16
5785	Sept. 4	Sept. 5	d	c	.1	434.4	433.2	1.2	44.4	42.	92.7	14.8	13.9	.9	10.4	.64	.448	.192	2.04	1.144	.896	.005	.08
5842	" 12	" 13	d	c	.1	444.	361.2	82.8	40.	39.2	98.	17.5	14.3	3.2	12.8	1.344	.528	.816	2.64	1.144	1.496	.004	.08
5930	" 25	" 26	d	c	.05	453.6	444.4	9.2	35.2	17.6	97.5	18.8	11.8	7.	13.2	1.28	.576	.704	2.18	1.06	1.12	.008	.08
5982	Oct. 2	Oct. 3	d	c	.2	448.4	444.4	4.	36.	31.2	100.	17.2	11.1	6.1	13.6	.96	.608	.352	1.94	1.06	.88	.015	.24
6074	" 16	" 17	d	c	.03	334.8	328.8	6.	20.8	18.	62.5	10.7	9.1	1.6	8.	.512	.384	.128	1.124	8.36	.288	.012	.4
6143	" 23	" 24	d	c	.2	390.4	372.	18.4	21.2	18.	75.	11.7	8.6	3.1	10.8	1.184	.608	.576	1.8	.776	1.024	.002	.28
6190	" 30	" 31	d	l	.15	383.6	370.	13.6	24.4	16.	73.4	11.9	10.9	1.	10.	1.152	.416	.736	1.96	.648	1.312	.004	.08
6235	Nov. 6	Nov. 7	d	c	.2	389.2	382.	7.2	22.8	22.	65.	12.3	10.5	1.8	8.	1.184	.544	.64	2.04	1.064	.976	.014	.32
6294	" 14	" 15	d	c	.06	404.8	398.4	6.4	43.2	40.	51.	11.5	8.6	2.9	6.4	1.04	.832	.208	1.96	1.56	.4	.044	1.84
6329	" 20	" 21	d	c	.13	384.4	372.4	12.	35.6	30.	50.5	11.3	9.7	1.6	6.8	.864	.544	.32	1.64	1.	.64	.08	1.72
6395	" 27	" 28	d	c	.3	401.6	397.6	4.	33.6	28.4	56.5	12.3	11.8	.5	6.4	1.184	.704	.48	1.96	1.44	.52	.05	1.44
6590	Dec. 26	Dec. 27	d	c	.3	401.6	389.2	12.4	48.	46.	49.5	12.3	11.9	.4	5.6	1.312	.96	.352	2.28	1.64	.64	.035	2.8
Average May 29—June 27						411.9	382.2	29.6	46.3	41.2	41.9	17.8	14.21	3.61	6.2	.772	.556	.216	1.805	1.142	.663	.045	.44
Average July 3—Dec. 26						886.4	377.4	508.9	42.5	34.	70.3	14.4	11.38	3.04	9.41	.937	.536	.401	3.317	1.111	2.206	.022	.55
Average May 29—Dec 26						810.5	378.2	432.2	43.1	35.1	65.8	14.7	12.19	2.59	8.91	.911	.539	.372	1.915	1.115	7.99	.026	.53

On July 17th, the odor was gassy; on November 27th, musty; on the other dates the water was odorless. The color upon ignition varied from gray to brown, more often was brown.

*n. f.

CHEMICAL EXAMINATION OF WATER FROM THE ILLINOIS RIVER AT OTTAWA.
(Parts per 1,000,000.)

Serial Number.	1899 Date of Collection.	Examination.	Appearance. Turbidity.	Sediment.	Color.	Residue on Evaporation. Total.	Dissolved.	Suspended.	Loss on Ignition. Total.	Dis-solved.	Chlorine.	Oxygen Consumed. Total.	By Dis-solved.	By Suspended Matt'r.	Nitrogen as Ammonia Free Ammonia.	Albuminoid Ammonia. Total.	Dis-solved.	Sus-pended.	Organic Nitrogen. Total.	Dissolved.	Suspended.	Nitrogen as Nitrites.	Nitrates.
5242	June 19	June 20	d	1	.3*.4	392.8	383.2	9.6	61.6	53.4	30.	15.9	15.8	.1	1.36	.544	.512	.032	1.24	.984	.256	.5	1.28
5295	" 26	" 27	d	1	.3	402.8	400.4	2.4	21.	23.6	47.	15.5	14.9	.6	3.28	.512	.496	.016	1.24	1.176	.064	.6	.6
5334	July 3	July 4	d	1	.15*.2	392.	374.4	17.6	43.6	26.8	45.	14.5	13.	1.5	3.28	.516	.432	.084	1.16	1.016	.144	.575	1.4
5386	" 10	" 11	d	1	.2*.4	406.	394.4	11.6	46.8	46.8	65.2	14.2	12.9	1.3	5.12	.48	.4	.08	1.24	.98	.26	.75	1.84
5432	" 17	" 18	d	c	.06	394.4	340.4	54.	39.6	39.2	47.	12.6	9.9	2.7	3.76	.384	.304	.08	1.24	.792	.448	.5	.44
5481	" 24	" 25	d	c	.2	408.	374.8	33.2	59.2	54.	36.5	13.4	12.	1.4	.96	.48	.364	.116	1.24	.952	.288	.55	1.72
5534	" 31	Aug. 2	d	c	.2	419.2	396.4	22.8	64.4	64.4	45.	14.3	12.7	1.6	4.48	.592	.432	.16	1.4	.824	.576	.7	2.6
5579	Aug. 7	" 8	d	1	.05	376.8	369.6	7.2	72.8	55.6	54.	12.5	11.5	1.	4.	.512	.304	.208	1.16	.856	.304	.875	2.6
5631	" 14	" 15	s	c	.1*.15	380.4	374.	6.4	60.	....	60.5	11.7	10.8	.9	4.24	.416	.32	.096	.856	.696	.16	.55	1.32
5677	" 21	" 22	s	1	.08*.1	393.2	392.8	.4	51.2	49.2	69.	11.9	11.7	.2	3.08	.448	.416	.032	.76	.68	.08	.95	2.6
5734	" 28	" 29	d	c	.15	432.8	411.2	21.6	47.6	42.8	75.5	14.3	12.3	2.	3.04	.688	.416	.272	1.56	.744	.816	1.25	2.8
5798	Sept. 4	Sept. 6	s	1	.06*.1	438.	436.	2.	51.2	49.6	88.	11.2	10.9	.3	4.8	.364	.352	.012	.856	.824	.032	1.125	3.
5839	" 11	" 12	s	1	.07*.1	436.4	426.	10.4	36.4	29.6	93.5	11.8	11.5	.3	6.08	.48	.368	.112	1.112	.696	.416	.9	2.24
5881	" 18	" 19	s	1	.04*.06	428.4	414.	14.4	33.6	30.	90.7	11.4	8.4	3.	7.68	.496	.288	.208	1.16	.824	.336	.375	1.48
5938	" 25	" 26	d	1	.06	402.4	389.2	13.2	30.4	24.4	82.5	10.2	8.4	1.8	6.4	.512	.448	.064	1.06	.836	.224	.375	2.4
5995	Oct. 3	Oct. 4	d	c	.2	444.	440.	4.	43.6	40.4	97.	11.9	11.7	.2	7.54	.464	.432	.032	.9	.836	.064	.4	3.
6032	" 9	" 10	d	1	.15*.2	438.8	429.2	9.6	37.6	29.2	85.	9.5	9.5	0.0	8.8	.544	.512	.032	1.06	.964	.096	.4	1.48
6084	" 16	" 18	d	1	.04*.2	366.8	319.6	47.2	51.6	44.8	70.	9.4	9.3	.1	8.8	.4	.368	.032	1.	.52	.48	.175	.68
6153	" 23	" 25	s	1	.1*.15	372.	356.4	15.6	20.	19.6	69.5	8.4	8.1	.3	6.08	.384	.352	.032	.92	.68	.24	.625	2.2
6198	" 30	Nov. 1	s	1	.1*.15	370.8	349.2	21.6	19.6	....	61.5	7.	7.	0.0	8.	.384	.32	064	.744	.648	.096	.225	.88
6241	Nov. 6	" 7	d	1	.05*.25	390.	369.6	20.4	36.	18.	65.	7.7	7.1	.6	7.52	.512	.432	.08	1.064	.712	.352	.15	.64
6277	" 13	" 14	s	1	.06*.1	364.4	358.	6.4	34.8	28.	30.	6.9	6.8	.1	4.8	.448	.352	.096	.68	.488	.192	.225	.56
6335	" 20	" 21	s	1	.04*.06	368.4	360.	8.4	31.6	18.	45.6	7.8	7.5	.3	4.8	.528	.4	.128	1.196	.936	.26	.25	2.2
6401	" 27	" 28	s	1	.03*.04	381.6	373.6	8.	27.6	23.2	47.	8.3	8.1	.2	5.28	.432	.416	.016	.936	.84	.096	.27	2.
6504	Dec. 11	Dec. 14	d	1	.03	371.2	365.6	5.6	35.6	34.4	44.5	11.2	10.9	.3	5.6	.608	.512	.096	1.48	.968	.512	.013	1.2
6575	" 21	" 23	d	c	.05	361.	332.4	28.6	27.2	23.6	36.	15.5	9.9	5.6	3.68	.8	.528	.272	1.48	.84	.64	.055	3.
6595	" 28	" 29	d	c	.04	339.6	327.2	12.4	24.8	23.2	24.5	11.9	10.7	1.2	2.4	.528	.304	.224	1.256	.936	.32	.05	4.
Average June 19—June 26						397.8	391.8	6.	42.8	38.5	38.5	15.7	15.3	.3	2.32	.528	.504	.024	1.24	1.08	.16	.55	.94
Average July 3—Dec. 28						395.	378.6	16.3	41.4	32.5	61.1	10.9	9.7	1.2	5.2	.496	.391	.105	1.1	.803	.297	.492	1.927
Average June 19—Dec. 28						395.2	379.6	15.3	41.2	35.6	59.4	11.3	10.5	1.	4.99	.498	.399	.099	1.111	.824	.287	.496	1.857

*Not Filtered.

CHEMICAL EXAMINATION OF WATER FROM THE ILLINOIS RIVER AT MORRIS.
(Parts per 1.000,000.)

Serial Number.	1990. Date of Collection.	Date of Examination.	Appearance. Turbidity.	Appearance. Sediment.	Appearance. Color.	Residue on Evaporation. Total.	Residue. Dissolved.	Residue. Suspended.	Loss on Ignition. Total.	Loss on Ignition. Dissolved.	Chlorine.	Oxygen Consumed. Total.	Oxygen Consumed. By Dissolved.	Oxygen Consumed. By Suspended Matt'r	Nitrogen as Ammonia. Free Ammonia.	Albuminoid Ammonia. Total.	Albuminoid Ammonia. Dissolved.	Albuminoid Ammonia. Suspended	Organic Nitrogen. Total.	Organic Nitrogen. Dissolved.	Organic Nitrogen. Suspended	Nitrogen as Nitrites.	Nitrogen as Nitrates.
6637	Jan. 5	Jan. 8	d	c	.3	432.	424.	8.	38.	29.6	63.	22.2	17.6	4.6	7.2	1.6	.896	.704	2.76	1.88	.88	.5	.68
6665	" 10	" 12	d	c	.5	432.	418.	14.	44.4	40.	85.	18.5	12.3	6.2	8.	2.	.8	1.2	3.36	1.84	1.52	.035	.44
6703	" 16	" 18	d	c	.06	364.	355.2	8.8	52.	48.4	50.	11.	9.7	1.3	5.36	.496	.448	.048	1.76	1.04	.72	.015	1.
6773	" 26	" 29	d	c	.04	408.	221.6	186.4	40.4	24.8	23.5	22.9	7.8	15.1	2.4	1.44	.288	1.152	3.04	.672	2.368	.03	.44
6786	" 29	" 29	d	c	.03	306.	254.	52.	31.6	22.	18.	12.1	7.4	4.7	1.76	.528	.256	.272	1.04	.48	.56	.025	.72
6846	Feb. 6	Feb. 7	d	l	.04	246.	220.	26.	16.8	16.4	26.5	7.7	6.2	1.5	2.24	.528	.304	.224	1.04	.64	.4	.02	.32
6893	" 12	" 14	vd	vm	.5	598.	206.	392.	48.	22.8	12.7	21.1	9.4	11.7	1.2	1.088	.304	.784	2.08	.576	1.504	.06	2.6
6942	" 19	" 21	d	c	.04	277.2	239.6	37.6	54.	40.4	24.	8.4	5.9	2.5	1.76	.768	.288	.48	1.68	1.8	.88	.04	.92
6986	" 26	" 28	d	c	.04	265.2	214.	51.2	22.	20.4	21.	9.2	6.8	2.4	1.68	.88	.352	.528	1.84	1.12	.72	.03	1.08
7037	Mar. 7	Mar. 9	d	c	.03	301.2	268.4	32.8	23.6	17.6	29.5	13.7	7.3	6.4	2.8	.8	.288	.512	1.84	.608	1.232	.045	.56
7123	" 19	" 21	d	c	.3	289.6	188.8	100.8	25.2	20.4	13.2	16.1	9.3	6.8	1.28	.96	.336	.624	1.64	.824	.816	.05	1.2
7187	" 28	" 30	d	c	.3	221.6	192.4	29.2	16.8	14.8	12.	15.4	8.8	6.6	1.12	.448	.304	.144	1.144	.824	.32	.04	.88
7220	April 3	Apr. 4	d	c	.15	372.8	190.4	182.4	32.4	20.4	10.1	15.8	8.3	7.5	.72	.656	.352	.304	1.432	.728	.704	.021	2.2
7273	" 9	" 11	d	c	.05	279.2	236.4	42.8	16.4	15.2	19.8	13.5	7.4	6.1	1.76	.48	.32	.16	1.4	.856	.544	.06	.88
7335	" 16	" 18	d	c	.04	333.6	252.	81.6	30.4	14.	26.1	11.	7.1	3.9	2.16	.48	.24	.24	1.304	.664	.64	.03	.68
7393	" 23	" 24	d	l	.03	270.	234.	36.	2.8	19.6	16.7	8.7	7.	1.7	2.4	.496	.272	.224	1.048	.696	.352	.05	.8
7441	" 30	May 2	d	c	.07	334.4	304.	30.4	38.	32.8	18.2	9.3	7.7	1.6	4.32	.48	.32	.16	1.12	.84	.28	.04	.44
7476	May 8	" 9	d	c	.04	215.6	200.4	15.2	20.4	20.	18.	7.7	7.2	.5	2.24	.384	.272	.112	.84	.52	.32	.04	.36
7559	" 15	" 17	d	c	.02	245.2	229.2	16.	29.6	28.	20.1	7.3	6.2	1.1	2.8	.32	.176	.144	.836	.516	.32	.125	.4
7588	" 21	" 23	s	l	.1	272.	249.6	22.4	43.6	32.4	25.	7.8	7.5	.3	2.	.448	.32	.128	.644	.48	.164	.125	.6
7620	" 28	" 29	s	l	.04	206.8	191.6	15.2	18.8	18.4	21.	6.2	6.	.2	1.92	.288	.224	.064	.68	.612	.068	.085	.72
7657	June 4	June 6	d	c	.03	257.2	205.6	51.6	34.4	27.6	17.	9.1	6.8	2.3	1.44	.4	.304	.096	.964	.68	.284	.125	1.4
7705	" 11	" 12	d	l	.03	264.	254.	10.	20.8	20.4	25.	7.2	6.4	.8	2.04	.32	.272	.048	.8	.48	.32	.2	.96
7743	" 18	" 20	d	c	.04	229.6	227.6	2.	23.6	22.	21.	6.8	5.8	1.	2.08	.272	.128	.144	.58	.388	.192	.08	.32
7790	" 28	" 28	vs	l	.01	258.	235.6	22.4	21.6	20.8	22.	6.9	6.2	.7	2.16	.24	.224	.016	.484	.42	.064	.16	.6
7850	July 5	July 7	s	vs	.02	248.4	226.8	21.6	3.8	30.4	19.5	8.1	4.6	3.5	1.2	.192	.176	.016	.612	.404	.208	.4	.68
7887	" 9	" 11	d	l	.03	343.2	321.2	22.	28.4	28.	......	12.	6.7	5.3	3.68	.288	.208	.08	.516	.42	.096	.23	.52
7944	" 17	" 18	d	l	....	240.4	221.6	18.8	27.2	26.	25.	6.8	6.7	.1	1.64	.288	.144	.144	.74	.484	.256	.275	.72
8012	" 23	" 24	d	l	.	244.4	216.8	27.6	24.4	23.6	25.	7.7	5.4	2.3	2.04	.272	.096	.176	.76	.42	.34	.18	.52

CHEMICAL EXAMINATION OF WATER FROM THE ILLINOIS RIVER AT MORRIS.—CONTINUED.
(Parts per 1,000,000.)

Serial Number.	1900. Date of Collection	1900. Date of Examination	Appearance. Turbidity.	Appearance. Sediment.	Appearance. Color.	Residue on Evaporation. Total.	Residue on Evaporation. Dissolved.	Residue on Evaporation. Suspended.	Residue on Evaporation. Loss on Ignition. Total.	Residue on Evaporation. Loss on Ignition. Dissolved.	Chlorine.	Oxygen Consumed. Total.	Oxygen Consumed. By Dissolved.	Oxygen Consumed. By Suspended Matt'r	Nitrogen as Ammonia. Free Ammonia.	Nitrogen as Ammonia. Albuminoid Ammonia. Total.	Nitrogen as Ammonia. Albuminoid Ammonia. Dissolved.	Nitrogen as Ammonia. Albuminoid Ammonia. Suspended	Organin Nitrogen. Total.	Organin Nitrogen. Dissolved.	Organin Nitrogen. Suspended	Nitrogen as Nitrites.	Nitrogen as Nitrates.
8062		Aug. 1		m	.02	337.2	191.6	145.6	44.8	28.	17.	12.5	5.2	7.3	1.216	.432	.192	.24	1.14	.58	.56	.18	.76
8128	Aug. 7	" 9	d	l	.01	254.8	233.6	21.2	43.2	38.8	26.	6.6	4.	2.6	2.56	.288	.192	.096	.648	.488	.16	.13	.44
8191	" 14	" 16	d	l	.01	240.8	196.	44.8	20.4	19.6	23.5	7.4	3.6	3.8	1.84	.488	.128	.32	.932	.3	.632	.15	.56
8247	" 20	" 22	d	l	.02	260.8	226.	34.8	22.8	22.	18.	5.8	5.1	.7	1.12	.368	.24	.128	.796	.252	.544	.22	1.64
8338	" 30	" 31	d	l	.02	309.6	230.8	78.8	35.2	26.	19.	12.5	4.4	8.1	1.536	.576	.224	.352	1.052	.332	.72	.08	.68
8382	Sept. 5	Sept. 6	d	c	.02	269.6	227.2	42.4	25.6	14.4	22.	8.4	4.	4.4	1.536	.432	.224	.208	.924	.4	.524	.225	.68
					0.04																		
8434	" 10	" 11	d	l	*.2	250.4	246.4	4.	22.	19.6	29.	7.6	4.8	2.8	2.4	.256	.24	.016	.588	.544	.044	.15	.46
8505	" 19	" 20		...	.15	266	263.2	2.8	22.	21.6	26.	8.9	6.7	2.2	2.72	.336	.272	.064	.54	.576	......	.006	.48
8541	" 25	" 26	d	l	.05	269.2	238.	31.2	27.6	26.	29.	8.	4.	4.	4.48	.544	.112	.432	.924	.4	.524	.08	.36
8626	Oct. 4	Oct. 6	d	c	.02	272.4	194.8	77.6	26.	18.4	23.	9.5	4.6	4.9	1.6	.4	.176	.224	.928	.464	.464	.12	.28
8666	" 15	" 16	d	l	.02	272.	199.6	72.4	23.6	18.8	24.	9.7	6.1	3.6	2.88	.512	.288	.224	1.44	.624	.816	.25	.27
8691	" 22	" 23	d	l	.02	235.2	197.6	37.6	28.	21.2	22.	8.5	5.6	2.9	2.72	.32	.288	.032	1.168	.72	.448	.15	.61
8718	" 29	" 30	d	l	.01	259.6	209.6	50.	24.4	15.6	17.	8.7	5.2	3.5	1.6	.384	.128	.256	.88	.384	.496	.22	.26
8759	Nov. 8	Nov. 9	d	l	.04	254.8	214.	40.8	22.4	21.6	17.	7.5	4.4	3.1	1.56	.352	.16	.192	.992	.512	.48	.07	.25
8779	" 13	" 14	d	l	.02	250.8	197.6	53.2	18.8	16.4	24.	8.1	5.2	2.9	.256	.48	.272	.208	1.2	.672	.528	.07	.49
8815	" 21	" 23	d	c	.08	296.4	204.8	91.6	20.	18.8	15.	12.	7.4	4.6	1.76	.512	.224	.288	1.36	.672	.688	.05	.55
8833	" 27	" 28	d	l	.1	275.	236.4	38.6	24.8	20.	20.	8.	6.1	1.9	1.84	.448	.208	.24	.912	.512	.4	.045	.995
8855	Dec. 3	Dec. 4	d	l	.05	247.2	223.6	23.6	18.	16.8	18.	8.2	6.1	2.1	1.6	.448	.24	.208	.976	.576	.4	.06	.5
8882	" 10	" 11	d	l	.12	224.8	216.4	8.4	23.2	22.	18.	7.3	7.1	.2	1.568	.576	.192	.384	.912	.48	.432	.025	.375
8905	" 17	" 19	d	l	.05	237.6	224.8	12.8	24.4	22.8	15.	8.3	7.5	.8	1.6	.352	.304	.048	.848	.592	.246	.013	1.227
8928	" 27	" 28	d	l	.03	229.6	196.	33.6	16.	15.2	15.	8.4	6.	2.4	1.68	.352	.256	.096	.976	.56	.416	.014	.386
Average Jan. 5–June 26						307.1	248.4	58.6	30.8	24.3	26.	11.8	7.9	3.9	2.596	.672	.331	.34	1.413	.767	.646	.081	.848
Average July 5–Dec. 27						263.6	222.1	41.4	26.	22.	21.1	12.9	5.4	7.5	1.553	.394	.207	.186	.91	.494	.415	.135	.587
Average Jan. 5–Dec. 27						285.3	235.3	50.	28.4	23.2	23.1	12.3	6.7	5.6	2.075	.535	.269	.265	1.162	.631	.531	.108	.717

During periods of high water and from Jan. 5th to July 11th the water was odorless, except Jan. 26th, when it was gassy. From June 18th to end of year it varied, but was generally musty. Color on ignition was nearly always brown.

*n. f.

CHEMICAL EXAMINATION OF WATER FROM THE ILLINOIS RIVER AT OTTAWA.
(Parts per 1,000,000.)

Serial Number.	1900 Date of Collection.	1900 Date of Examination	Appearance. Turbidity.	Appearance. Sediment.	Appearance. Color.	Residue on Evaporation. Total.	Residue on Evaporation. Dissolved.	Residue on Evaporation. Suspended.	Residue on Evaporation. Loss on Ignition. Total.	Residue on Evaporation. Loss on Ignition. Dis-solved.	Chlorine.	Oxygen Consumed. Total.	Oxygen Consumed. By Dis-solved.	Oxygen Consumed. By Suspended Matt'r	Nitrogen as Ammonia. Free Ammonia.	Nitrogen as Ammonia. Albuminoid Ammonia. Total.	Nitrogen as Ammonia. Albuminoid Ammonia. Dis-solved.	Nitrogen as Ammonia. Albuminoid Ammonia. Sus-pended	Organic Nitrogen. Total.	Organic Nitrogen. Dissolved	Organic Nitrogen. Suspended	Nitrogen as Nitrites.	Nitrogen as Nitrates.
6628	Jan. 4	Jan. 5	d	c	.07	414.4	410.	4.4	39.6	38.	39.	14.8	13.6	1.2	4.8	.656	.464	.192	1.56	.936	.624	.2	2.2
6677	“ 11	“ 12	d	c	.07	364.4	352.8	11.6	37.2	33.6	40.	11.2	9.4	1.8	4.4	.736	.512	.224	1.44	.56	.88	.13	1.28
6724	“ 18	“ 20	d	c	.04	351.2	334.	17.2	24.6	24.	31.	9.3	8.5	.8	3.2	.512	.368	.144	.96	.8	.16	.035	1.48
6771	“ 25	“ 27	d	c	.06	330.4	278.4	52.	38.4	37.6	25.	11.5	6.6	4.9	2.56	1.056	.32	.736	1.92	.672	1.248	.035	1.08
6844	Feb. 5	Feb. 7	d	l	.03	236.	235.2	.8	20.4	19.2	21.	7.4	5.9	1.5	1.76	.416	.256	.16	.88	.544	.336	.02	.72
6949	“ 20	“ 22	d	c	.2	312.	290.4	21.6	46.4	28.8	17.	9.1	7.9	1.2	1.76	.496	.304	.192	.8	.576	.224	.06	2.6
7024	Mar. 5	Mar. 7	d	l	.3	326.4	324.	2.4	28.4	26.	19.	11.5	10.6	.9	1.76	.384	.32	.064	.896	.704	.192	.044	2.
7077	“ 12	“ 14	d	m	.04	262.4	166.	96.4	24.	16.8	8.5	12.8	6.3	6.3	.864	.512	.256	.256	1.28	.48	.8	.022	1.48
7127	“ 20	“ 26	d	c	.02	194.8	184.	10.8	7.2	6.8	3.2	4.1	3.6	.5	.576	.176	.144	.032	.392	.344	.048	.032	1.04
7174	“ 27	“ 29	d	l	04*.1	315.6	309.2	6.4	34.8	30.8	8.	15.1	9.4	5.7	1.2	.352	.224	.128	.76	.6	.16	.07	3.2
7231	Apr. 3	Apr. 5	d	l	.03	380.4	368.	12.4	15.6	12.	7.2	8.1	7.9	.2	1.12	.336	.256	.08	.728	.6	.128	.06	1.76
7289	“ 10	“ 12	d	c	.15	391.6	382.8	8.8	16.8	14.4	8.9	10.3	9.3	1.	1.2	.512	.32	.192	1.112	.792	.32	.09	2.8
7339	“ 17	“ 19	d	c	.04	422.8	418.8	4.	36.8	33.2	8.3	12.6	11.3	1.3	.608	.768	.44	.328	1.72	1.08	.64	.08	2.4
7407	“ 24	“ 26	d	c	....	379.2	366.8	12.4	29.2	29.2	7.1	12.2	11.2	1.	.24	.96	.528	.432	1.88	1.016	.864	.07	1.04
7448	May 1	May 3	d	c	.1	336.4	251.2	85.2	26.8	16.4	11.4	14.2	9.1	5.1	.56	.48	.288	.192	1.12	.8	.32	.14	1.48
7488	“ 8	“ 10	d	c	.03	269.2	228.	41.2	33.6	25.2	16.2	9.1	8.1	1.	1.12	.416	.288	.128	.96	.68	.28	.3	.92
7546	“ 15	“ 17	..	...	.05	302.	278.	24.	44.4	42.	18.4	9.3	8.	1.3	.576	.416	.224	.192	1.06	.484	.576	.35	1.68
7598	“ 22	“ 24	d	c	.05	280.	258.8	21.2	42.	35.2	14.2	8.5	7.3	1.2	.48	.24	.128	.112	.804	.612	.192	.02	1.4
7671	June 5	June 6	d	c	.03	259.6	217.2	42.4	42.	36.	18.	8.6	6.	2.6	.704	.288	.128	.16	.74	.468	.272	.55	1.76
7701	“ 11	“ 13	d	l	.03	308.4	288.8	19.6	42.8	27.2	27.	8.7	7.7	1.	1.04	.288	.16	.128	.74	.48	.26	.5	2.8

CHEMICAL EXAMINATION OF WATER FROM THE ILLINOIS RIVER AT OTTAWA.—CONTINUED.
(Parts per 1,000,000.)

Serial Number.	1900 Date of Collection.	Date of Examination.	Appearance. Turbidity.	Sediment.	Color.	Residue on Evaporation. Total.	Dissolved.	Suspended.	Loss on Ignition. Total.	Dis-solved.	Chlorine.	Oxygen Consumed. Total.	By Dis-solved.	By Suspended Matt'r	Nitrogen as Ammonia Free Ammonia.	Albuminoid Ammonia. Total.	Dis-solved.	Sus-pended	Organic Nitrogen Total.	Dissolved.	Suspended	Nitrogen as Nitrites.	Nitrates.
7744	June 18	June 20	d	l	.01	257.2	240.	17.2	26.	26.	23.	6.6	6.2	.4	1.36	.224	.192	.032	.532	.372	.16	.18	1.2
7785	25	27	v	m	.01	235.2	230.8	4.4	34.	31.6	23.	5.7	5.4	.3	.656	.256	.192	.064	.528	.484	.044	.45	1.2
7819	July 2	July 4	d	l	.03	249.2	243.2	6.	27.6	22.8	22.5	7.2	5.8	1.4	.21	.208	.16	.048	.456	.28	.176	.8	2.16
7891	9	11	d	l	.1	256.8	243.2	13.6	35.2	25.6	25.	5.7	4.7	1.	.496	.176	.144	.032	.484	.292	.192	.425	1.86
7936	16	17	d	l	.02	417.6	261.2	156.4	40.4	31.6	27.	5.4	4.8	.6	.376	.176	.112	.064	.484	.244	.24	.4	1.64
7997	23	24	d	l	.02	238.4	217.2	21.2	19.2	17.6	22.	6.9	5.1	1.8	.336	.176	.096	.08	.596	.452	.144	.325	1.48
8046	30	31	d	l	.02	261.6	238.4	23.2	28.	28.	20.	7.6	6.9	.7	.704	.272	.192	.08	.628	.42	.208	.4	1.68
8138	Aug. 6	Aug. 9	d	l	....	236.4	217.2	19.2	35.2	....	22.	6.3	5.	1.3	.144	.288	.272	.016	.516	.468	.048	.6	1.72
8170	13	15	d	l	.01	218.4	192.4	16.	36.	19.2	24.	4.8	3.9	.9	.704	.272	.176	.096	.52	.284	.236	.325	1.44
8242	20	21	d	l	....	226.4	224.	2.4	34.8	14.8	22.	6.1	4.3	1.8	.576	.24	.144	.096	.54	.332	.208	.45	1.52
8297	27	28	d	l	....	280.8	250.4	30.4	21.6	20.8	32.	6.9	4.7	2.2	1.8	.192	.192	.00	.732	.62	.112	.475	1.12
8365	Sept. 4	Sept. 5	d	c	.03	234.8	220	14.8	20.	17.2	20.	6.1	4.5	1.6	.288	.27	.208	.062	.344	.28	.064	.3	1.68
8432	10	11	d	l	.1*.1	300.	282.8	17.2	31.6	27.2	28.	8.7	6.	2.7	.576	.32	.304	.016	.764	.496	.268	.5	1.8
8484	17	18	s	l	.02*.02	248.4	231.2	17.2	28.	19.2	29.	7.7	4.1	3.6	2.24	.4	.192	.208	.764	.32	.444	.017	1.04
8536	24	25	d	c	.08*.1	321.	320.8	.2	38.8	26.	54.	8.1	6.7	1.4	4.8	.48	.224	.256	.7	.64	.06	.3	1.28
8595	Oct. 1	Oct. 2	s	l	.04*.05	223.6	217.2	6.4	20.8	19.6	27.	5.2	4.3	.9	1.52	.288	.128	.16	.528	.368	.16	.275	1.28
8634	6	8	s	l	.03*.08	211.6	198.	13.6	22.4	19.2	22.	5.6	4.6	1.	1.216	.192	....	....	.512	.304	.208	.25	.87
Average Jan. 4—June 25............						314.9	291.5	23.4	31.4	26.8	17.9	10.	8.1	1.8	1.479	.476	.285	.191	1.036	.641	.395	.156	1.7
Average July 2—Oct. 6						261.6	237.1	24.5	29.3	23.8	26.4	6.5	5.	1.5	1.07	.263	.186	.076	.571	.386	.185	.389	1.5
Average Jan. 4—Oct. 6						293.3	269.4	23.8	30.5	25.6	21.4	8.6	6.8	1.7	1.313	.39	.245	.144	.848	.537	.31	.25	1.62

*Not Filtered.

CHEMICAL EXAMINATION OF WATER IN THE ILLINOIS RIVER AT LA SALLE.

(Parts per 1,000,000.)

Serial Number.	1897 Date of		Appearance.			Residue on Evaporation.					Chlorine.	Oxygen Consumed.			Nitrogen as Ammonia				Organic Nitrogen.			Nitrogen as	
	Collection.	Examination.	Turbidity.	Sediment.	Color.	Total.	Dissolved.	Suspended.	Loss on Ignition. Total.	Loss on Ignition. Dissolved.		Total.	By Dissolved.	By Suspended Matt'r	Free Ammonia.	Albuminoid Ammonia. Total.	Albuminoid Ammonia. Dissolved.	Albuminoid Ammonia. Suspended	Total.	Dissolved.	Suspended	Nitrites.	Nitrates.
1802	Jan. 5	Jan. 6	v d	m	.8	420.	271.2	148.8	30.8	8.	10.	21.5	9.2	12.3	.468	.96	.56	.4	1.76	1.42	.64	.08	4.
1826	" 14	" 15	v d	c	5*.8	340.4	314.4	26.	20.8	20.	9.	12.6	9.4	3.2	.4	.52	.4	.12	1.12	.88	.24	.04	3.5
1834	" 18	" 19	v d	c	.2	422.	305.2	116.8	21.6	44.4	8.	14.8	6.9	7.9	.48	.64	.4	.24	1.44	.8	.64	.04	2.8
1876	Feb. 2	Feb. 1	d	l	.1	352.8	349.2	3.6	13.2	6.8	10.	9.1	8.9	.2	.88	.48	.368	.112	1.28	1.4	.24	.045	2.2
1894	" 8	" 9	s	l	1*.15	346.8	343.2	3.6	14.	10.	13.	10.	7.8	2.2	1.2	.36	.28	.8	.88	.8	.08	.065	2.2
1925	" 17	" 18	d	l	1*.15	311.2	290.	21.2	14.	7.6	9.	10.4	6.8	3.6	.76	.72	.24	.48	1.12	.88	.24	.025	2.2
1943	" 24	" 25	d	c	.4	320.4	283.2	37.2	43.6	36.8	5.2	9.3	6.2	3.1	2.08	.48	.32	.16	.06	.72	.24	.03	3.2
1958	Mar. 1	Mar. 2	s	l	3*.4	288.4	269.6	18.8	48.4	45.6	8.	9.8	7.1	2.7	.56	.52	.48	.4	1.35	.91	.44	.02	3.1
1978	" 8	" 9	d	c	.1	312.	240.	72.	44.8	38.	7.	13.1	7.6	5.5	.64	.56	.4	.16	1.23	.95	.48	.04	2.3
2009	" 15	" 16	d	c	.3	334.	266.4	67.6	39.2	35.6	6.	13.3	7.8	5.5	.46	.64	.24	.4	1.07	.61	.4	.065	3.1
2036	" 22	" 23	d	m	.6	425.2	237.6	187.6	54.	42.8	3.4	22.	7.5	18.5	.112	.96	.32	.64	1.55	.6	.95	.045	3.3
2058	" 29	" 30	d	c	.5	352.	284.4	67.6	46.8	44.	6.	12.	5.7	6.3	.08	.4	.16	.24	.83	.68	.15	.045	3.8
2098	Apr. 5	Apr. 7	d	c	.8	346.	296.	50.	43.2	31.6	8.	9.	6.	3.	.176	.48	.176	.304	1.07	.67	.4	.067	3.2
2120	" 12	" 14	d	c	.2	367.2	281.6	35.6	34.4	28.4	8.	13.5	8.9	4.6	.496	.44	.272	.168	.91	.75	.16	.08	2.4
2138	" 20	" 22	d	l	*.15	337.2	366.2	22.	49.2	48.	10.	15.5	8.9	6.6	.8	.48	.336	.144	1.	.69	.31	.12	1.6
2467	" 29	" 30	d	c	1*.2	337.2	315.6	21.6	44.8	37.2	10.	12.8	9.3	3.5	.56	.64	.368	.272	1.35	1.03	.32	.25	2.2
2199	May 10	May 4	d	l	.7	331.2	302.	29.2	36.4	30.	11.	14.1	10.3	3.8	.32	.4	.32	.08	2.15	1.11	1.04	.24	1.7
2228	" 17	" 11	d	c	.15	342.8	303.2	39.6	48.	36.4	12.	13.3	8.6	4.7	.272	.88	.288	.592	1.23	.75	.48	.25	1.9
2256	" 24	" 19	d	l	.3	332.4	318.	14.4	43.6	32.4	18.	11.8	9.2	2.6	.72	.64	.56	.08	1.23	.83	.4	.35	1.9
2277	" 31	May 25	d	....	.1	342.8	366.4	26.4	26.8	18.	17.	13.2	11.6	1.6	.8	.72	.4	.32	1.4	1.	.4	.32	1.4
2313	June 10	June 1	d	m	.2	349.2	319.2	80.	48.	33.2	26.	13.6	12.	7.6	.8	.8	.45	.32	1.37	1.21	.16	.575	2.
2325	" 15	" 12	d	c	.03	348.	336.	12.	36.	34.	29.	14.8	12.5	2.3	.256	.72	.4	.32	1.85	1.29	.56	.875	1.8
2360	" 22	" 16	d	c	.3	345.2	268.	177.2	45.6	32.	11.	15.1	11.3	3.8	.32	.56	.4	.16	1.7	1.95	.65	.6	2.5
2395	" 30	" 23	d	c	.15	372.8	352.	20.8	54.	50.	18.	17.5	11.1	6.4	.4	.4	.32	.8	1.37	1.13	.24	.65	2.7
2428	July 8	July 1	d	c	.15	371.2	308.	63.2	46.	26.	23.	13.7	11.4	2.3	.24	.56	.38	.18	1.32	1.08	.24	1.	1.5

CHEMICAL EXAMINATION OF WATER FROM THE ILLINOIS RIVER AT LA SALLE. CONTINUED.
(Parts per 1,000,000.)

Serial Number.	1897 Date of		Appearance			Residue on Evaporation.					Chlorine.	Oxygen Consumed.			Nitrogen as Ammonia				Organic Nitrogen.			Nitrogen as	
									Loss on Ignition.						Free Ammonia.	Albuminoid Ammonia.							
	Collec-tion.	Exami-nation	Turbidity.	Sediment.	Color.	Total.	Dissolved.	Suspended.	Total.	Dis-solved.		Total.	By Dis-solved.	By Suspen ded Matt'r		Total.	Dis-solved.	Sus-pended	Total.	Dissolved.	Suspended	Nitrites.	Nitrates.
2448	July 15	July 16	d	c	.15	388.	354.	34.	32.	28.	31.	16.9	14.2	2.7	1.28	.88	.608	.272	1.72	1.4	.32	1.	1.7
2477	22	23	d	c	.3	344.	305.2	38.8	28.	20.	23.	16.5	14.7	1.8	1.28	.72	.48	.24	1.56	1.24	.32	.675	.7
2510	30	31	d	1	.2	379.2	342.	37.2	48.	34.	39.	14.	11.8	2.2	1.12	.8	.56	.24	1.4	1.	.4	.85	1.6
2531	Aug. 4	Aug. 5	d	c	.1	358.	334.4	23.6	28.	24.4	42.	13.5	12.2	1.3	.48	.72	.416	.304	1.2	1.04	.16	.95	3.
2551	12	13	d	c	.15	440.	404.4	35.6	68.	53.2	60.	12.6	12.	.6	2.24	.56	.416	.144	1.16	1.	.16	.125	2.5
2583	1	23	d	c	.1	436.6	388.8	44.8	62.	56.8	58.	13.2	11.5	1.7	1.36	.8	.384	.416	1.4	1.	.4	.7	2.2
2608	27	30	d	c	.15	4?1.	402.	19.	46.	40.	71.	13.8	10.8	3.	1.76	.56	.4	.16	1.14	.74	.4	1.6	2.5
2626	Sept. 3	Sept. 4	d	c	.15*.3	388.8	376.	12.8	28.8	28.	66.	13.3	10.5	2.8	2.4	.56	.36	.2	1.06	.98	.08	1.5	1.8
2660	10	13	d	c	.2	36?.?	341.2	22.	26.	22.8	55.	12.5	9.8	2.7	.48	.52	.4	.12	1.06	.9	.16	.2	1.
2685	18	20	d	c	.1	469.2	377.6	91.6	33.2	24.8	69.	13.5	9.8	3.7	5.2	.72	.4	.32	1.14	.74	.4	.6	2.
2714	24	27	d	c	.05	410.4	384.	26.4	29.2	24.	67.	12.5	10.7	1.8	2.4	.56	.36	.2	.86	.74	.12	1.	3.5
2738	Oct. 1	Oct. 2	d	c	.05	4?3.2	394.	29.2	47.6	26.	73.	13.3	11.	2.3	3.6	.52	.36	.16	.86	.78	.08	1.375	2.5
2786	12	13	d	1	.15	4?3.2	388.4	34.8	43.2	39.6	68.	12.4	10.7	1.7	5.6	.48	.4	.08	1.02	.78	.24	.55	1.9
2820	19	20	d	c	.1	4?1.6	376.	35.6	30.4	29.2	65.	12.9	8.	4.9	5.6	.64	.52	.12	.98	.62	.36	.075	1.7
2866	29	Nov. 1	s	1	.05	379.2	364.	15.2	36.	32.	61.	13.	10.2	2.8	5.	.44	.4	.04	.78	.7	.08	.45	1.5
2907	Nov. 6	8	d	1	.1*.15	365.2	356.8	8.4	36.	28.	59.	10.8	9.	1.8	5.	.44	.36	.08	1.1	.86	.24	.35	1.8
2962	16	18	d	c	.15	344.8	335.2	9.6	24.4	21.2	45.	10.6	8.	2.6	4.	.44	.36	.08	.78	.62	.16	.625	1.2
2993	27	29	d	1	.1	355.6	334.8	20.8	28.4	26.	34.	9.6	7.5	2.1	2.88	.44	.32	.12	1.18	.86	.32	.15	.7
3047	Dec.10	Dec.11	d	c	.15	416.	411.6	4.4	26.	23.6	53.	12.3	11.	1.3	4.6	.64	.36	.28	1.57	.81	.76	.13	.8
3070	15	16	d	1	.08*.1	355.2	349.6	5.6	31.2	25.6	39.	9.	7.3	1.7	4.8	.52	.44	.08	.93	.69	.24	.2	.9
3108	29	30	d	1	.15	449.2	440.	9.2	31.2	22.8	51.	13.4	10.9	2.5	6.	.68	.48	.2	1.33	1.05	.28	.2	1.2
Average Jan. 5th–June 30th........						351.1	299.	52.	37.5	30.	11.3	13.4	8.7	4.6	.507	.6	.354	.246	1.3	.89	.41	.201	2.5
Average July 8th–Dec. 29th........						394.9	367.2	28.2	36.3	29.8	52.3	12.8	10.5	2.2	3.06	.6	.416	.183	1.16	.89	.269	.695	1.7
Average Jan. 5th–Dec. 29th........						272.1	331.4	40.6	36.9	29.9	30.9	13.1	9.6	3.5	1.728	.6	.384	.216	1.23	.89	.343	.441	2.1

Chemical Examination of Water from the Illinois River at LaSalle.
(Parts per 1,000,000.)

Serial Number.	1898 Date of Collection	1898 Date of Examination	Appearance. Turbidity.	Appearance. Sediment.	Appearance. Color.	Residue on Evaporation. Total.	Residue on Evaporation. Dissolved.	Residue on Evaporation. Suspended.	Loss on Ignition. Total.	Loss on Ignition. Dissolved.	Chlorine.	Oxygen Consumed. Total.	Oxygen Consumed. By Dissolved.	Oxygen Consumed. By Suspended Matt'r	Nitrogen as Ammonia. Free Ammonia.	Albuminoid Ammonia. Total.	Albuminoid Ammonia. Dissolved.	Albuminoid Ammonia. Suspended	Organic Nitrogen. Total.	Organic Nitrogen. Dissolved.	Organic Nitrogen. Suspended	Nitrogen as Nitrites.	Nitrogen as Nitrates.
3127	Jan. 4	Jan. 5	s	l	.1*.2	387.2	383.6	3.6	34.8	32.8	35.	9.	7.7	1.3	4.	.64	....	....	1.49	.97	.52	.1	.6
3175	" 18	" 19	d	l	.2*.4	388.8	378.	10.8	18.	16.	26.	9.3	7.7	1.6	2.6	.52	.4	.12	1	.72	.28	.08	1.3
3192	" 21	" 24	d	m	.4	402.	296.	106.	36.	26.	16.	14.3	7.5	6.8	1.6	.6	.32	.28	1.08	.72	.36	.2	1.9
3230	Feb. 4	Feb. 5	d	l	.15*.3	370.8	366.8	4.	34.	31.6	14.	6.8	5.5	1.3	.64	.28	.24	.04	.44	.32	.12	.15	4.8
3262	" 14	" 15	d	c	.2	202.8	155.2	47.6	29.2	28.	2.	13.6	9.2	4.4	.2	.44	.272	.168	1.16	.64	.52	.03	1.1
3365	Mar. 17	Mar. 18	d	c	.2	290.4	255.2	35.2	41.2	34.8	3.6	10.6	8.2	2.4	.2	.4	.36	.04	.92	.72	.2	.035	1.1
3421	April 4	April 4	d	l	.15*.4	297.6	272.4	25.2	37.2	36.	6.	9.8	8.7	1.1	.148	.04	.36	.04	.85	.65	.2	.025	1.4
3439	" 9	" 11	d	l	.15*.4	296.4	286.4	10.	23.2	22.	7.	12.3	11.6	.7	.44	.56	.48	.08	.97	.85	.12	.03	1.
3456	" 15	" 16	d	c	.15*.3	321.2	286.8	34.4	34.8	27.6	9.	13.6	12.6	1.	.72	.56	.48	.08	1.25	.93	.32	.065	.4
3499	" 25	" 26	d	c	.05*.12	324.8	308.	16.8	38.8	36.	15.	13.	11.5	1.5	1.16	.52	.44	.08	1.17	.85	.32	.17	.85
3524	May 2	May 3	d	c	.1	420.	322.4	97.6	40.	36.	16.	14.3	8.6	5.7	.88	.6	.44	.16	1.43	.94	.49	.23	.6
3545	" 9	" 10	d	c	.05*.3	345.2	324.	21.2	44.8	42.	16.	12.	8.	4.	.68	.44	.36	.08	1.06	.78	.28	.26	1.
3571	" 13	" 14	d	c	.06*.15	412.	356.4	55.6	70.8	62.8	21.	14.2	9.5	4.7	1.	.52	.44	.08	1.3	.86	.44	.25	.65
3598	" 20	" 23	d	m	.04	984.	273.2	710.8	62.	44.	10.	29.	11.8	17.2	.4	1.2	.52	.68	3.14	.78	2.36	.14	.9
3696	June 16	June 17	d	m	....	408.84	303.6	105.2	41.6	40.4	15.	13.5	8.3	5.2	.48	52	.32	.2	1.04	.68	.36	.3	.45
3727	" 24	" 25	d	m	....	457.2	298.4	158.8	39.6	26.4	20.	13.	7.2	5.8	.24	.68	.28	.4	1.24	.76	.48	.35	1.85
3777	July 5	July 6	d	c	....	370.4	309.6	60.8	40.	28.8	16.	13.8	8.1	5.7	.016	.64	.36	.28	1.4	.76	.64	.22	.5
3869	" 25	" 26	d	c	.04	410.4	356.	54.4	30.	27.2	82.	14.2	10.8	3.4	.8	.72	.44	.28	1.52	1.04	.48	.8	.5
3917	Aug. 6	Aug. 8	d	c	.04	467.6	379.6	88.	42.	35.2	65.	16.5	8.8	7.7	2.2	.88	.4	.48	1.84	.92	.92	.8	.6
3944	" 11	" 12	d	c	.05	424.4	364.8	59.6	36.8	31.6	60.	14.2	9.1	5.1	2.64	.64	.44	.2	.96	.76	.2	.8	.85
4016	" 30	" 31	d	c	.04	392.	338.8	53.2	43.2	38.	49.	11.	8.2	2.8	1.6	.48	.36	.12	1.04	.68	.36	1.	.3
4079	Spt. 14	Sept. 15	d	c	.05	378.	332.4	45.6	42.8	37.2	40.	10.2	7.	3.2	2.	.4	.28	.12	1.04	.56	.48	.25	.4
4143	" 29	" 30	d	c	.06	405.2	356.8	48.4	58.	36.8	43.	10.6	6.3	4.3	1.76	.48	.32	.16	.88	.6	.28	.33	.5
4177	Oct. 6	Oct. 7	d	c	.05	407.2	367.2	40.	53.6	31.2	50.	10.6	7.3	3.3	4.6	.4	.32	.08	.88	.6	.28	.3	.3
4251	" 24	" 25	d	l	.04	356.8	348.	8.8	36.	32.	31.	7.	6.5	.5	2.4	.32	.24	.08	.61	.49	.12	.12	.5
4306	Nov. 2	Nov. 3	d	l	.03	399.6	394.	5.6	38.8	36.	21.	8.	6.	2.	1.28	.32	.28	.04	.65	.57	.08	.09	1.35
4342	" 9	" 10	d	l	15*.2	380.8	380.4	.4	48.	47.6	21.	7.5	7.	.5	1.28	.4	.28	.12	.71	.55	.16	.09	.6
4455	Dec. 5	Dec. 6	d	l	03*.05	398.	386.	12.	52.	42.	17.	7.5	7.	.5	1.	.304	.208	.096	.77	.57	.2	.042	1.25
4499	" 19	" 20	s	l	15*.2	437.2	426.8	10.4	67.2	62.	26.	9.1	8.6	.5	2.	.368	.304	.064	.77	.65	.12	.025	.25
Average Jan. 4th—June 24th						394.3	304.1	90.1	39.1	33.9	14.4	12.1	8.9	3.2	.974	.555	.357	.198	1.22	.76	.46	.15	1.24
Average July 5th—Dec. 19th						402.1	364.6	37.4	45.2	37.3	40.	10.7	7.7	3.	1.762	.488	.325	.163	1.74	.67	.97	.372	.6
Average Jan. 4th—Dec. 19th						397.8	331.2	66.5	41.8	35.4	25.9	11.2	8.4	2.7	1.396	.525	.342	.182	1.15	.72	.43	.25	.95

*Not Filtered.

CHEMICAL EXAMINATION OF WATER FROM THE ILLINOIS RIVER AT LA SALLE.
(Parts Per 1,000,000.)

Serial Number.	1899. Date of		Appearance.			Residue on Evaporation.					Chlorine.	Oxygen Consumed.			Nitrogen as Ammonia				Organic Nitrogen.			Nitrogen as	
									Loss on Ignition.						Free Ammonia.	Albuminoid Ammonia.							
	Collec-tion.	Exami-nation.	Turbidity.	Sediment.	Color.	Total.	Dissolved.	Suspended.	Total.	Dis-solved.		Total.	By Dis-solved.	By Suspended Matt'r		Total.	Dis-solved.	Sus-pended	Total.	Dissolved.	Suspended	Nitrites.	Nitrates.
4706	Feb. 15	Feb. 16	d	l	.3	416.	410.	6.	58.	56.	31.	12.6	9.8	2.8	3.2	.528	.4	.128	1.26	.9	.36	.14	.75
4760	Mar. 1	Mar. 2	vd	vm	.6	776.	178.	598.	94.	34.	12.	47.	15.	32.	.16	1.608	.32	1.288	3.7	.74	2.9	.035	.9
4886	Apr. 3	Apr. 4	vd	c	.2	262.	224.	38.	42.	38.	9.	13.8	9.8	4.	.56	.52	.352	.168	1.15	.75	.4	.045	1.2
5006	May 5	May 6	d	c	.06	414.4	358.4	56.	45.2	44.	22.	14.2	13.9	.3	1.76	.56	.512	.048	1.29	1.17	.12	.25	1.28
5080	" 24	" 25	d		.04	389.2	364.	25.2	29.6	24.8	16.	14.5	12.8	1.7	.8	.48	.352	.128	1.21	.945	.265	.06	1.6
5116	" 30	" 31	vd	vm	.2	507.6	292.8	214.8	83.2	59.2	11.5	22.1	12.1	10.	.8	.656	.32	.336	1.85	.826	1.624	.2	1.24
5160	June 6	June 7	d	c	.3	354.	308.8	45.2	36.	35.2	9.	15.9	12.6	3.3	.36	.48	.364	.096	1.29	.806	.464	.32	1.32
5219	" 15	" 16	d	m	.3	420.4	350.4	70.	40.8	37.6	47.5	19.2	14.9	4.3	1.28	.608	.362	.256	1.56	1.144	.416	.4	1.22
5250	" 20	" 21	d	c	.3	462.	374.4	87.6	72.	52.	27.	14.8	12.9	1.9	.88	.704	.384	.32	1.32	.856	.464	.35	1.84
52?7	" 27	" 28	d	l	.4	451.2	402.	49.	34.8	27.6	43.5	16.3	14.1	2.2	1.92	.576	.422	.154	1.64	1.16	.48	.56	1.76
5339	July 4	July 5	d	c	.15	412.8	376.4	36.4	52.	49.2	42.	17.	12.9	4.1	1.04	.544	.432	.112	1.56	.92	.64	.55	2.4
5390	" 11	" 11	d		.25	412.4	374.	38.4	53.6	46.8	66.	14.	12.3	1.7	2.8	.512	.368	.144	1.16	.984	.176	1.1	2.8
5442	" 18	" 19	d		.15	350.	292.4	57.6	49.6	43.2	30.	13.6	10.5	3.1	2.48	.608	.272	.336	1.4	.728	.672	.38	1.8
5487	" 25	" 26	d	c	.15	411.6	344.	67.6	60.8	57.6	31.5	13.1	9.8	3.3	.24	.576	.32	.256	1.32	.792	.528	.28	1.76
5538	Aug. 1	Aug. 2	d	c	.25	432.4	377.6	54.8	85.2	78.	47.	16.	12.	4.	1.28	.544	.352	.192	1.3	.888	.432	.7	2.4
5585	" 8	" 9	d	c	.07	407.4	374.4	33.2	60.4	53.2	47.5	13.7	11.5	2.2	.80	.528	.304	.224	1.32	.76	.56	.7	2.8
5637	" 15	" 16	d	c	.15	406.4	385.6	20.8	64.	61.2	57.5	13.3	11.4	1.9	1.6	.496	.352	.144	1.208	.664	.544	.6	2.8
5686	" 22	" 23	d	c	.1	420.4	381.6	38.8	51.2	43.6	64.	13.7	10.8	2.9	1.2	.576	.384	.192	1.24	.888	.352	.34	3.2

Chemical Examination of Water from the Illinois River at La Salle—Continued.
(Parts per 1,000,000.)

Serial Number.	1899. Date of Collection.	1899. Date of Examination.	Appearance. Turbidity.	Appearance. Sediment.	Appearance. Color.	Residue on Evaporation. Total.	Residue on Evaporation. Dissolved.	Residue on Evaporation. Suspended.	Loss on Ignition. Total.	Loss on Ignition. Dissolved.	Chlorine.	Oxygen Consumed. Total.	Oxygen Consumed. By Dissolved.	Oxygen Consumed. By Suspended Matt'r.	Nitrogen as Ammonia. Free Ammonia.	Albuminoid Ammonia. Total.	Albuminoid Ammonia. Dissolved.	Albuminoid Ammonia. Suspended	Organic Nitrogen. Total.	Organic Nitrogen. Dissolved.	Organic Nitrogen. Suspended	Nitrogen as Nitrites.	Nitrogen as Nitrates.
5736	Aug. 29	Aug. 30	d	c	.08	418.4	397.2	21.2	51.6	43.6	66.	12.3	9.	3.3	.288	.528	.32	.208	1.32	.92	.4	.75	2.6
5792	Sept. 5	Sept. 6	d	c	.06	492.	426.	66.	32.8	28.	75.5	13.3	7.9	5.4	2.8	.544	.48	.064	1.464	.856	.608	1.	3.5
5845	" 12	" 13	d	c	.06	426.4	393.2	33.2	40.	36.	69.5	12.2	11.1	1.1	4.	.416	.32	.096	1.08	.312	.768	.5	2.4
5893	" 19	" 20	d	l	.03	424.4	392.	32.4	33.2	33.2	73.	11.	7.9	3.1	4.4	.448	.368	.08	1.16	.392	.768	.325	2.4
5941	" 26	" 27	d	c	.04	402.	388.8	13.2	28.	24.8	73.	10.1	8.	2.1	.57	.448	.336	.112	.868	.74	.128	.3	1.88
5997	Oct. 3	Oct. 4	d	c	.15	437.2	421.6	15.6	86.4	49.2	84.5	12.	10.8	1.2	5.92	.448	.416	.032	1.14	.804	.336	.175	1.72
6039	" 10	" 11	d	c	.08	432.	424.8	7.2	26.4	25.2	76.	9.7	9.4	.3	6.08	.464	.416	.048	1.06	.9	.16	.225	1.44
6080	" 17	" 18	d	l	.03	400.4	378.4	22.	33.2	29.2	68.	11.6	9.3	2.3	5.92	.416	.384	.032	1.032	.704	.328	.375	1.88
6149	" 24	" 25	d	c	.1	395.6	353.6	42.	33.2	22.4	60.	10.4	7.8	2.6	4.64	.434	.368	.096	.92	.584	.336	.3	2.
6201	" 31	Nov. 1	d	c	.12	387.6	367.2	20.4	38.4	30.4	53.5	7.7	7.7	0.0	4.32	.4	.288	.112	.84	.612	.228	.275	1.44
6244	Nov. 7	" 8	d	l	.07*.15	403.6	399.2	4.4	32.8	19.6	54.	7.4	7.1	.3	5.12	.512	.272	.24	1.032	.68	.352	.15	1.16
6296	" 14	" 15	d	l	.03	351.2	341.6	9.6	24.	24.	33.	7.2	7.	.2	3.04	.32	.288	.032	.76	.584	.176	1.5	1.12
6340	" 21	" 22	d	c	.04	348.4	345.2	3.2	36.	34.	36.5	7.5	7.2	.3	2.72	.32	.288	.032	1.196	.68	.516	.325	3.
6405	" 28	" 29	d	l	.04	402.8	389.2	13.6	50.8	49.2	38.	7.9	7.6	.3	3.84	.368	.32	.048	.936	.744	.192	.24	.512
6465	Dec. 5	Dec. 7	d	c	.1	380.	362.8	17.2	48.4	36.8	42.5	9.4	lo't	. .	4.32	.416	.32	.096	1.065	.776	.288	.14	2.08
6508	" 12	" 14	d	c	.06	403.6	373.6	30.	45.6	43.2	42.5	10.	9.5	.5	4.32	.56	.448	.112	1.128	.904	.224	.15	1.4
6545	" 19	" 20	d	c	.3	368.	353.2	14.8	37.2	29.2	31.5	12.3	10.7	1.6	3.84	.648	.528	.12	1.48	1.064	.416	.065	2.8
6588	" 26	" 28	d	c	.06	358.	326.	32.	48.4	48.4	21.	13.9	9.8	4.1	1.92	.432	.32	.112	1.	.872	.128	.065	4.
Average Feb. 15—June 27						465.2	326.2	118.9	53.5	40.8	22.85	19.	12.7	6.2	1.17	.672	.379	.292	1.627	.931	.695	.236	1.31
Average July 4—Dec. 26						403.2	374.6	29.6	46.5	39.9	53.21	11.5	9.5	1.9	3.06	.482	.356	.125	1.154	.759	.394	.442	2.2
Average Feb. 15—Dec. 26						414.9	361.1	53.7	49.	40.2	44.77	13.6	10.4	3.1	2.53	.534	.362	.172	1.285	.807	.477	.385	1.955

*Not Filtered.

CHEMICAL EXAMINATION OF WATER FROM THE ILLINOIS AND RIVER AT LA SALLE.
(Parts per 1,000,000.)

Serial Number.	1900. Date of Collection.	Examination.	Appearance. Turbidity.	Sediment.	Color.	Residue on Evaporation. Total.	Dissolved.	Suspended.	Loss on Ignition. Total.	Dis-solved.	Chlorine.	Oxygen Consumed. Total.	By Dis-solved.	By Suspended Matt'r.	Nitrogen as Ammonia. Free Ammonia.	Albuminoid Ammonia. Total.	Dis-solved.	Sus-pended	Organic Nitrogen. Total.	Dissolved.	Suspended	Nitrogen as Nitrites.	Nitrates.
6605	Jan. 2	Jan. 3	d	c	.04	418.8	418.	.8	53.2	52.4	40.2	11.6	11.	.6	3.84	.64	.512	.128	1.32	1.064	.256	.065	3.52
65?2	“ 9	“ 19	d	c	.05	392.8	389.2	3.6	49.6	46.	39.	11.	9.6	1.4	4.16	.672	.448	.224	1.56	.984	.576	.1	2.
669?	“ 16	“ 17	d	c	.06	359.2	332.4	26.8	34.8	24.4	24.	9.4	8.5	.9	3.2	.528	.416	.112	1.28	1.024	.256	.03	1.72
6741	“ 23	“ 24	d	c	.15	327.6	270.8	56.8	32.4	32.	21.7	14.2	9.1	5.1	2.24	.704	.384	.32	1.76	.864	.896	.025	1.6
6792	“ 30	“ 3	d	c	.05	254.8	239.6	?5.2	18.4	14.8	14.	9.4	6.9	2.5	1.36	.32	.24	.08	.8	.544	.256	.04	1.24
6852	Feb. 6	Feb. 7	d	l	.03	276.4	270.	6.4	30.8	29.6	17.	6.7	6.7	...	1.28	.288	.256	.032	.608	.544	.064	.05	.76
6897	“ 13	“ 14	d	m	.3	454.8	198.8	256.	44.8	24.	11.	18.5	8.6	9.9	.896	.8	.336	.464	1.84	.736	1.104	.07	3.
6939	“ 20	“ 21	d	c	.2	285.6	259.2	26.4	52.8	39.6	14.2	8.9	8.8	.1	1.152	.448	.304	.144	1.12	.736	.384	.035	2.6
6987	“ 27	“ 28	d	c	.4	276.	222.8	53.2	56.8	30.8	14.7	8.8	7.8	1.	1.04	.448	.32	.128	1.04	.768	.272	.032	2.4
7028	Mar. 6	Mar. 7	d	c	.1	260.	253.6	6.4	20.	16.8	14.	10.6	7.9	2.7	1.088	.352	.288	.064	.896	.8	.096	.023	1.6
7074	“ 13	“ 14	d	m	.4	436.8	82.	354.8	38.	14.8	3.7	26.6	8.3	18.3	.368	.864	.368	.496	2.08	.64	1.44	.011	.48
7122	“ 20	“ 21	d	c	.3	242.4	174.8	67.6	20.	20.	3.5	12.6	8.9	3.7	.592	.48	.272	.208	1.16	.632	.528	.03	1.72
7167	“ 27	“ 28	d	c	.3	237.6	174.4	63.2	23.6	15.6	5.7	13.	9.5	3.5	.384	.432	.32	.112	1.24	.76	.48	.014	1.8
7221	Apr. 3	Apr. 4	d	c	.4	412.4	180.4	232.	33.6	21.2	5.6	16.7	8.5	8.2	.288	.592	.256	.336	1.304	.632	.672	.018	2.4
7276	“ 10	“ 11	d	c	.15	269.2	217.6	51.6	27.6	26.8	9.1	12.2	8.5	3.7	.576	.384	.256	.128	1.048	.63?	.416	.035	1.76
7331	“ 17	“ 18	d	c	.1	274.8	236.8	38.	32.	29.2	11.	9.	8.8	.2	.56	.32	.256	.064	.824	.6	.224	.038	1.32
7399	“ 24	“ 25	d	c	.04	290.	260.8	29.2	29.6	27.2	10.9	9.5	8.4	1.1	.72	.384	.272	.112	1.08	.76	.32	.065	1.6
7443	May 1	May 2	d	c	.2	299.6	262.	37.6	37.6	24.	8.5	14.5	9.6	4.9	.176	.448	.288	.16	1.16	.8	.36	.08	1.52
748	“ 8	“ 9	d	c	.25	284	254.4	29.6	32.4	25.6	16.	13.7	8.7	5.	1.12	.48	.4	.08	1.092	.644	.448	.25	1.08
75?8	“ 15	“ 16	d	c	...	276.	268.4	7.6	28.8	6.4	14.2	8.4	8.1	.3	.256	.372	.256	.116	.9	.83?	.064	.15	1.6
7581	“ 22	“ 23	d	l	.03	277.2	272.4	4.8	36.	35.6	13.9	9.5	8.6	.9	.32	.25	.224	.032	.74	.644	.096	.075	1.12
7617	“ 29	“ 30	d	l	.04	247.6	226.4	21.2	28.	27.6	18.	8.3	7.2	1.1	.48	.32	.208	.112	.74	.58	.16	.175	1.68
7659	June 5	June 6	d	c	.04	283.2	206.8	76.4	38.4	29.6	16.	9.2	6.5	2.7	.448	.352	.208	.144	.9	.52	.38	.3	2.4

CHEMICAL EXAMINATION OF WATER FROM THE ILLINOIS RIVER AT LA SALLE. CONTINUED.
(Parts per 1,000,000.)

Serial Number.	1900. Date of Collection.	Date of Examination.	Appearance. Turbidity.	Sediment.	Color.	Residue on Evaporation. Total.	Dissolved.	Suspended.	Loss on Ignition. Total.	Loss on Ignition. Dissolved.	Chlorine.	Oxygen Consumed. Total.	By Dissolved.	By Suspended Matt'r	Nitrogen as Ammonia. Free Ammonia.	Albuminoid Ammonia. Total.	Albuminoid Dissolved.	Albuminoid Suspended	Organic Nitrogen. Total.	Dissolved.	Suspended	Nitrogen as Nitrites.	Nitrates.
7699	June 12	June 13	d	1	.03	302.8	281.6	21.2	20.8	16.	23.	7.6	6.9	.7	.456	.272	.224	.048	.64	.52	.12	.35	2.6
7747	" 19	" 20	d	1	.15	272.8	252.4	20.4	32.	24.	21.	17.6	6.3	11.3	.832	.32	.224	.096	.484	.452	.032	.021	1.
7777	" 26	" 27	1	1	.05	262.	235.	26.	22.	21.2	19.5	7.7	6.4	1.3	.616	.24	.112	.128	.692	.516	.176	.22	1.28
7825	July 3	July 4	d	1	.01	262.8	240.4	22.4	38.8	28.4	20.	6.5	6.3	.2	.176	.192	.16	.032	.48	.484	.064	.25	1.84
7889	" 10	" 11	d	1	.03	279.6	244.	35.6	26.4	22.4	27.	8.5	5.8	2.7	.112	.272	.176	.096	.548	.452	.096	.375	1.84
7942	" 17	" 18	d	1	.....	268.	238.	30.	28.	2.4	25.	6.2	5.2	1.	.224	.192	.08	.112	.58	.436	.144	.3	2.
8010	" 24	" 25	d	1	.01	301.2	232.	69.2	22.	22.	21.	7.2	4.9	2.3	.144	.288	.112	.176	.612	.42	.192	.17	1.28
8060	" 31	Aug. 1	d	1	.02	258.8	216.4	42.4	42.	40.4	19.5	7.7	5.	2.7	.272	.272	.176	.096	.996	.356	.64	.180	1.32
8111	Aug. 7	" 8	d	1	.01	229.2	227.6	1.6	32.	....	23.	7.	4.9	2.1	.272	.24	.192	.048	.52	.408	.112	.425	1.72
8177	" 14	" 15	d	1	.01	220.4	204.4	16.	23.6	16.	22.5	6.5	4.2	2.3	.256	.272	.192	.08	.644	.348	.296	.35	1.72
8245	" 21	" 22	d	1	.02	248.4	226.	22.4	31.6	8.4	20.	6.9	4.6	2.3	.144	.272	.224	.048	.572	.124	.448	.2	1.44
8311	" 28	" 29	d	1	.02	278.4	240.	38.4	22.8	20.	20.	8.1	4.6	3.5	.352	.304	.096	.208	.7	.38	.32	.475	1.64
8359	Sept. 4	Sept. 5	d	c	.03	258.8	238.8	20.	21.2	18.4	19.	8.1	4.7	3.4	2.08	.256	.192	.064	.392	.232	.16	.3	1.72
8440	" 11	" 12	d	1	.05*.1	278.	266.8	11.2	26.4	24.8	25.	7.8	6.2	1.6	.4	.32	.16	.16	1.24	.592	.648	.325	1.72
8487	" 18	" 19	d	c	.01*.04	252.8	244.	8.8	27.2	17.6	27.	8.	5.9	2.1	2.08	.272	.176	.096	.92	.608	.312	.018	1.08
8538	" 25	" 26	d	1	.02*.25	335.2	319.2	16.	38.4	36.4	47.	8.2	6.6	1.6	3.28	.48	.208	.272	.84	.672	.152	.22	1.88
8599	Oct. 2	Oct. 3	d	1	.01*.05	250.8	238.	12.8	27.6	22.	24.	6.	5.2	.8	2.72	.32	.256	.064	.524	.416	.108	.23	1.13
Average Jan. 2d—June 26th........						306.7	247.7	58.9	33.6	26.7	15.8	11.7	8.2	3.5	1.095	.45	.294	.155	1.082	.712	.369	.088	1.76
Average July 3rd—Oct. 2d..........						265.1	241.1	24.	29.1	24.5	24.3	7.6	5.2	2.4	.718	.282	.171	.111	.687	.423	.264	.272	1.59
Average Jan. 2d—Oct. 2d...........						292.4	245.4	46.9	32.	25.9	18.7	10.1	7.2	2.9	.963	.391	.251	.142	.944	.611	.332	.152	1.7

*Not Filtered.

CHEMICAL EXAMINATION OF WATER FROM THE ILLINOIS RIVER AT OTTAWA
(Parts per 1,000,000.)

Serial Number.	1901 Date of Collection.	Date of Examination.	Appearance. Turbidity.	Sediment.	Color.	Residue on Evaporation. Total.	Dissolved.	Suspended.	Loss on Ignition. Total.	Dissolved.	Chlorine.	Oxygen Consumed. Total.	By Dissolved.	By Suspended Matt'r.	Nitrogen as Ammonia. Free Ammonia.	Albuminoid Ammonia. Total.	Dissolved.	Suspended.	Organic Nitrogen. Total.	Dissolved.	Suspended.	Nitrogen as Nitrites.	Nitrates.
9202	July 20	July 23	d	1	.05	290.4	283.2	7.2	75.2	73.2	26.	8.6	7.8	.8	1.264	.224	.16	.064	1.072	.688	.384	.5	.9
9203	"	"	d	1	.04	233.6	225.2	8.4	23.2	18.8	25.	7.1	6.	1.1	.288	.192	.16	.032	1.572	.432	1.14	.75	2.13
9204	"	"	d	1	.01*.05	224.8	221.6	3.2	17.2	17.2	26.	6.8	6.2	.6	.288	.224	.16	.064	1.552	.432	1.12	.9	1.98
9205	"	"	d	1	.1	307.2	274.	33.2	79.2	64.	26.	7.4	6.8	.6	.04	.24	.208	.032	1.072	.704	.368	.45	1.11
9278	Aug. 5	Aug. 6	d	1	.03*.1	230.4	216.4	14.	28.8	26.8	28.	6.8	6.6	.2	1.552	.256	.224	.032	.544	.512	.032	.44	.8
9288	" 8	" 9	d	1	.05*.05	204.8	204.4	.4	25.6	36.	23.	7.7	6.8	.9	1.216	.24	.208	.032	.576	.368	.208	.4	1.
9305	" 15	" 19	d	1	.02	211.2	188.8	22.4	17.2	17.2	20.	6.4	6.1	.3	.192	.224	.144	.08	.56	.448	.112	.625	1.375
9334	" 29	" 30	d	1	.04	221.2	198.8	22.4	22.	26.4	24.	6.1	6.	.1	1.28	.24	.16	.08	.656	.512	.144	.5	.94
9355	Sept. 6	Sept. 7	d	1	.01*.02	212.	186.8	25.2	16.4	16.4	21.	5.5	5.1	.4	.48	.208	.16	.048	.48	.48	.....	.45	1.03
9368	" 12	" 14	d	1	.01*.02	196.4	184.8	11.6	16.	16.	19.	5.5	4.9	.6	.608	.224	.144	.08	.....	.....	.....	.375	1.065
9396	" 20	" 21	d	1	.03	239.2	233.6	5.6	24.4	....	28.	6.8	6.5	.3	1.152	.208	.16	.048	.....	.....	.....	.35	1.05
9414	" 26	" 28	d	1	.03	219.2	206.	13.2	29.2	35.2	20.5	5.7	5.7	...	.752	.224	.128	.096	.....	.....	.....	.325	1.155
9433	Oct. 3	Oct. 5	d	1	.1	202.8	190.4	12.4	10.4	20.	20.	6.7	6.4	.3	.101	.224	.224	....	.....	.....	.....	.275	.925
9473	" 10	" 14	d	1	.04*.05	190.	172.	18.	10.	13.6	20.	6.3	...	...	.208	.176	.144	.032	.....	.....	.....	.6	1.8
9557	" 22	" 23	d	1	.05	221.6	186.4	35.2	20.8	13.6	20.	6.2	5.3	.9	.8	.24	.192	.048	.....	.....	.....	.16	1.12
9615	" 29	" 30	d	1	.04	197.6	166.8	30.8	14.	12.8	19.5	6.8	5.2	1.6	.752	.224	.192	.032	.....	.....	.....	.....	.....
Average July 20—Oct.28						225.1	208.7	16.4	26.8	25.4	23.4	6.6	5.8	.8	.97	.223	.173	.05	.898	.508	.39	.454	1.209

*Not filtered.

CHEMICAL EXAMINATION OF WATER FROM THE ILLINOIS RIVER AT AVERYVILLE.
(Parts per 1,000,000.)

Serial Number.	1897 Date of Collection.	1897 Date of Examination.	Appearance. Turbidity.	Appearance. Sediment.	Appearance. Color.	Residue on Evaporation. Total.	Residue on Evaporation. Dissolved.	Residue on Evaporation. Suspended.	Residue on Evaporation. Loss on Ignition. Total.	Residue on Evaporation. Loss on Ignition. Dissolved.	Chlorine.	Oxygen Consumed. Total.	Oxygen Consumed. By Dissolved.	Oxygen Consumed. By Suspended Matt'r	Nitrogen as Ammonia. Free Ammonia.	Nitrogen as Ammonia. Albuminoid Ammonia. Total.	Nitrogen as Ammonia. Albuminoid Ammonia. Dissolved.	Nitrogen as Ammonia. Albuminoid Ammonia. Suspended	Organic Nitrogen. Total.	Organic Nitrogen. Dissolved.	Organic Nitrogen. Suspended	Nitrogen as Nitrites.	Nitrogen as Nitrates.
2153	Apr. 26	Apr. 27	d	l	.2	303.2	289.2	14.	44.	43.6	10.	11.	.....	.....	.2	.44	.....	.....	.79	.....	.....	.075	2.
2177	May 3	May 4	d	c	.....	316.	304.8	11.2	45.2	40.	11.	11.7	.....	.....	.24	.44	.....	.....	.95	.....	.....	.18	2.2
2204	" 11	" 12	d	l	.1*.15	316.8	306.	10.8	23.6	19.6	10.	12.	9.	3.	.128	.56	.256	.304	1.19	.79	.4	.11	2.2
2220	" 17	" 18	d	c	.7	327.2	321.3	6.	22.8	22.	11.	13.4	9.4	4.	.08	.56	.48	.08	1.23	.....	.....	.14	1.4
2253	" 24	" 25	d	c	.2	352.4	328.	24.4	39.6	36.	14.	11.4	10.2	1.2	.16	.56	.4	.16	1.23	1.	.23	.1	1.5
2278	" 31	June 1	d	c	.15	366.8	328.	38.8	18.8	18.4	16.	12.9	8.9	4.	.32	.64	.4	.24	1.07	.91	.16	.14	1.7
2301	June 7	" 8	d	c	.15	367.6	325.2	42.4	31.2	28.4	20.	13.	11.	2.	.56	.8	.64	.16	1.21	.89	.32	.17	1.8
2357	" 21	" 22	d	c	.15	378.4	352.8	25.6	30.	26.	26.	12.3	11.5	.8	.16	.44	.4	.04	1.13	1.05	.08	.325	3.
2380	" 28	" 29	d	c	.....	326.8	302.8	25.	44.	40.	9.	22.2	13.2	9.	.048	.48	.384	.096	1.21	.97	.24	.25	2.1
2412	July 5	July 6	d	c	.....	316.4	286.4	30.	28.4	27.2	13.	12.	8.8	3.2	.05	.4	.28	.12	1.16	1.08	.08	.25	1.6
2436	" 12	" 13	d	c	.06	335.2	286.8	48.4	22.4	16.	17.	12.9	8.4	4.5	.048	.64	.24	.4	1.16	.92	.24	.320	2.
2464	" 19	" 20	d	c	.15	350.4	306.	44.4	39.6	20.	20.	12.5	10.4	2.3	.064	.64	.4	.24	1.16	.76	.4	.26	1.5
2488	" 26	" 27	d	c	.06	278.	258.	20.	24.	22.	20.	10.9	10.1	.8	.024	.4	.256	.144	1.	.85	.16	.27	1.75
2519	Aug. 2	Aug. 3	d	c	.15	338.8	320.	18.8	40.	26.	24.	13.8	13.	.8	.224	.48	.416	.064	1.28	.8	.48	.35	1.7
2539	" 9	" 10	d	c	.08	300.	290.	10.	16.8	15.2	24.	10.2	9.5	.7	.096	.64	.352	.288	1.08	1.	.08	.3	1.8
2566	" 16	" 17	d	c	.07	338.8	322.8	16.	21.6	14.8	32.	11.	10.2	.8	.08	.48	.32	.16	1.16	.92	.24	.2	1.7
2586	" 23	" 24	d	c	.15*.2	334.	322.	2.	24.8	22.	38.	11.7	11.	.7	.4	.56	.416	.144	1.08	.76	.32	.125	1.2
2615	" 30	" 31	d	c	.2	366.4	342.	24.4	24.	22.	44.	12.8	11.3	1.5	.28	.6	.44	.16	1.06	.82	.24	.11	1.1
2631	Sept. 7	Sept. 7	d	c	.1*.2	363.2	342.8	20.4	22.	18.4	53.	11.3	9.2	2.1	.32	.6	.48	.12	.98	.9	.08	.22	1.3
2666	" 13	" 14	d	c	.2	363.2	341.2	22.	26.	22.8	55.	12.5	9.8	2.7	.48	.57	.4	.12	1.06	.9	.16	.2	1.
2691	" 20	" 21	d	c	.1	371.2	364.	7.2	15.2	10.8	59.	10.6	9.	1.6	.4	.44	.36	.08	.98	.82	.16	.27	1.4
2720	" 27	" 28	d	l	.15	371.2	347.2	24.	36.8	8.	60.	11.7	9.7	2.	.32	.5	.36	.24	1.26	.94	.32	.34	1.
2753	Oct. 4	Oct. 5	s	l	.1*.3	376.8	360.	16.8	44.8	40.	61.	13.5	13.	.5	.4	.56	.52	.04	1.18	.87	.24	.525	1.5
2774	" 11	" 12	d	l	.07	397.2	382.8	14.4	36.	27.2	65.	11.2	10.5	.7	.32	.56	.44	.12	.84	.94	.16	.375	1.6
2816	" 18	" 19	d	c	.15	394.8	374.	20.8	32.	30.8	65.	10.6	8.8	1.8	.2	.64	.36	.28	.78	.7	.08	.4	2.3
2839	" 25	" 26	s	l	.08*.1	402.8	394.4	8.4	35.6	32.	71.	10.8	9.6	1.2	.088	.48	.4	.08	.7	.66	.04	.75	.7
2872	Nov. 1	Nov. 2	d	l	.05	397.2	392.4	4.8	30.8	28.8	65.	10.7	8.	2.7	.2	.36	.28	.08	.78	.66	.12	1.	1.45
2914	" 8	" 9	d	l	04*.06	383.6	378.4	5.2	39.2	38.	64.	8.9	8.	.9	.4	.36	.24	.12	.86	.58	.28	.4	3.3
2951	" 15	" 16	d	c	.06	388.	369.6	18.4	31.2	30.4	60.	9.	6.4	2.6	2.	.34	.28	.06	.86	.66	.2	.15	2.3
2975	" 22	" 23	d	c	.06	382.	368.	14.	39.2	33.2	55.	9.9	7.6	2.3	2.64	.4	.32	.08	.46	.38	.08	.15	2.3
3004	" 29	" 30	d	l	.15*.2	364.4	374.	16.8	31.2	28.4	51.	8.	6.8	1.2	3.04	.36	.28	.08	.77	.57	.2	.06	1.7
3024	Dec. 6	Dec. 7	d	l	07*.09	374.8	370.8	4.	35.2	32.4	51.	7.4	7.1	.3	3.36	.4	.32	.08	.85	.77	.08	.125	1.9
3057	" 13	" 14	d	l	.08*.1	366.4	355.6	10.8	30.8	18.8	46.	6.8	6.4	.4	3.2	.3	.26	.04	.73	.69	.04	.055	1.15
3075	" 27	" 21	d	c	.07	397.6	380.	17.6	27.6	22.4	47.	8.5	7.7	.8	4.8	.44	.36	.08	1.01	.89	.12	.03	1.1
3097	" 27	" 28	d	l	.1*15	387.6	380.	7.6	22.8	22.	42.	8.2	7.8	.4	4.2	.48	.4	.08	1.01	.85	.16	.175	1.1
Average April 26—June 2.......						339.4	317.5	21.9	33.2	30.4	14.	13.3	10.4	3.4	.21	.54	.423	.154	1.12	.93	.23	.265	1.96
Average July 5—Dec. 27						362.6	345.4	17.2	29.9	24.2	46.	10.6	9.1	1.5	1.062	.48	.353	.134	.97	.79	.18	.285	1.59
Average April 26—Dec. 28						356.7	338.3	18.4	30.7	25.8	37.	11.3	9.4	1.9	.843	.5	.367	.138	1.01	.79	.19	.254	1.69

Chemical Examination of Water from the Illinois River at Averyville.

(Parts per 1,000,000.)

Serial Number.	1897 Date of Collection.	1897 Date of Examination.	Appearance. Turbidity.	Appearance. Sediment.	Appearance. Color.	Residue on Evaporation. Total.	Residue on Evaporation. Dissolved.	Residue on Evaporation. Suspended.	Residue on Evaporation. Loss on Ignition. Total.	Residue on Evaporation. Loss on Ignition. Dis-solved.	Chlorine.	Oxygen Consumed. Total.	Oxygen Consumed. By Dis-solved.	Oxygen Consumed. By Suspended Matt'r	Nitrogen as Ammonia. Free Ammonia.	Nitrogen as Ammonia. Albuminoid Ammonia. Total.	Nitrogen as Ammonia. Albuminoid Ammonia. Dis-solved.	Nitrogen as Ammonia. Albuminoid Ammonia. Sus-pended	Organic Nitrogen. Total.	Organic Nitrogen. Dissolved.	Organic Nitrogen. Suspended	Nitrogen as Nitrites.	Nitrogen as Nitrates.
4561	Jan. 3	Jan. 4	d	l	.1	357.6	342.	15.6	54.4	44.8	21.	12.	8.8	3.2	1.72	.4	.32	.08	.89	.73	.16	.015	.35
4611	" 9	" 16	d	l	.06	316.	295.2	20.8	46.	38.	15.	10.5	8.3	2.2	1.28	.32	.24	.08	.73	.53	.2	.03	1.02
4613	" 16	" 17	d	c	.2	290.8	270.8	20.	54.	46.	14.	12.5	8.7	3.8	1.2	.44	.272	.168	.77	.57	.2	.035	.35
4640	" 23	" 24	d	c	.3	282.8	242.4	40.4	44.8	39.2	10.	13.	8.5	4.5	.88	.4	.256	.144	.93	.65	.28	.025	.85
4661	" 30	" 31	d	l	.2	332.8	310.	22.8	48.	46.	12.	10.5	8.8	1.7	.88	.416	.288	.128	.93	.77	.16	.03	.7
4678	Feb. 6	Feb. 7	d	l	.1*.15	328.	322.	6.	46.	43.2	14.	8.9	7.5	1.4	1.12	.4	.32	.08	.66	.5	.16	.014	1.75
4698	" 13	" 14	d	l	.06*.2	378.	372.	6.	40.	36.	23.	11.8	8.8	.3	1.76	.44	.304	.136	.82	.66	.16	.04	1.3
4726	" 19	" 21	d	l	.3*.4	360.	356.	4.	50.	46.	23.	11.8	9.5	2.3	2.	.44	.36	.08	.9	.74	.16	.045	1.25
4751	" 27	" 28	d	c	.3	401.2	320.	81.2	62.	58.	26.	18.7	12.	6.7	2.56	.68	.44	.24	1.34	.74	.6	.04	.3
4775	Mar. 6	Mar. 7	vd	vm	.5	434.	180.8	253.2	64.	42.	10.	31.7	14.	17.7	.8	.92	.48	.44	2.02	.98	1.04	.025	.9
4802	" 13	" 14	vd	vm	.4	398.	148.	250.	54.	36.	6.	26.5	12.5	14.	.6	.8	.352	.448	1.94	.74	1.2	.015	1.25
4833	" 20	" 21	d	c	.04	350.	188.	162.	50.	42.	6.	16.6	9.	7.6	.48	.48	.272	.208	1.02	.54	.48	.04	1.25
4856	" 27	" 28	d	m	.04	346.	182.7	163.3	50.	38.	5.6	17.	8.8	8.2	.48	.6	.288	.312	1.27	.55	.72	.035	1.3
4885	Apr. 3	Apr. 4	d	c	.3	248.	206.8	41.2	52.	42.	8.	13.5	9.5	4.	.56	.48	.304	.176	.83	.6	.(?)3	.02	1.75
4911	" 10	" 11	d	c	.05	262.	218.8	43.2	42.	36.	9.	12.4	9.	3.4	.56	.4	.32	.08	.79	.59	.2	.035	1.6
4939	" 17	" 18	d	c	.05	284.	256.	28.	52.	35.2	8.	11.	8.7	2.3	.48	.4	.32	.08	.71	.6	.11	.04	1.6
4956	" 24	" 25	d	c	.05*.3	299.6	280.4	19.2	46.	38.8	12.	11.8	8.9	2.9	.4	.56	.32	.24	1.25	.73	.52	.075	1.25
4982	May 1	May 2	d	c	.04	318.	302.8	15.2	50.	49.2	13.	12.5	9.3	3.2	.208	.48	.224	.256	1.05	.53	.52	.084	.95
5039	" 15	" 16	d	c	.2	430.4	374.8	55.6	63.6	60.	19.2	14.	9.4	4.6	.864	.512	.416	.096	1.29	.89	.4	.085	.96
5073	" 22	" 23	d	c	.04	391.2	354.	37.2	31.2	21.2	18.5	14.6	10.	4.6	.96	.416	.352	.064	1.29	.97	.32	.045	.52
5132	" 30	June 1	d	c	.1	394.4	341.2	53.2	58.8	39.2	16.	11.3	10.7	.6	.352	.48	.32	.16	1.05	.89	.16	.08	1.48
5192	June 8	" 9	d	c	.15	415.6	290.	125.6	34.4	32.	17.5	13.1	11.4	1.7	.288	.524	.416	.108	1.24	.986	.254	.25	1.8
5253	" 20	" 21	d	c	.1	365.2	333.2	32.	35.2	32.8	17.5	13.3	11.1	2.2	.088	.448	.384	.064	1.32	.952	.368	.13	1.2
5302	" 27	" 28	d	c	.1	407.6	362.4	45.2	29.6	28.8	25.	14.	12.7	1.3	.256	.512	.432	.08	1.24	1.048	.192	.185	1.68
5333	July 3	July 4	d	c	.2	400.4	356.4	44.	69.6	62.4	26.	14.3	12.3	2.	.144	.528	.368	.16	1.32	.92	.4	.13	1.76
5349	" 10	" 12	d	c	……	396.8	374.	22.8	26.	24.	37.2	13.5	13.2	.3	.352	.544	.336	.208	1.24	.728	.512	.26	1.8
5439	" 18	" 19	d	c	.15	423.2	378.4	44.8	50.8	48.4	46.	12.9	11.3	1.6	1.6	.512	.352	.16	1.32	.842	.496	.46	2.

*n. f.

CHEMICAL EXAMINATION OF WATER FROM THE ILLINOIS RIVER AT AVERYVILLE.—CONTINUED.
(Parts per 1,000,000.)

Serial Number.	1899 Date of		Appearance.			Residue on Evaporation.					Chlorine.	Oxygen Consumed.			Nitrogen as Ammonia				Organic Nitrogen.			Nitrogen as	
									Loss on Ignition.						Free Ammonia.	Albuminoid Ammonia.							
	Collection.	Examination.	Turbidity.	Sediment.	Color.	Total.	Dissolved.	Suspended.	Total.	Dissolved.		Total.	By Dissolved.	By Suspended Matt'r.		Total.	Dissolved.	Suspended	Total.	Dissolved.	Suspended	Nitrites.	Nitrates.
5486	July 24	July 25	d	c	.1	315.2	294.4	20.8	50.4	48.8	31.	9.1	8.3	.8	.704	.512	.304	.208	1.16	.856	.304	.29	1.76
5536	Aug. 1	Aug. 2	d	c	.2	386.4	323.6	62.8	61.2	59.2	34.	12.7	10.5	2.2	.384	.448	.288	.16	1.16	.728	.432	.25	1.52
5587	" 8	" 9	d	c	.06	392.4	338.8	53.6	49.6	48.	30.	12.2	10.8	1.4	.16	.352	.272	.08	1.08	.856	.224	.15	1.4
5634	" 15	" 16	d	c	.15	400.	352.4	47.6	85.2	76.	38.5	11.9	10.6	1.3	.416	.416	.24	.176	1.016	.728	.288	.22	1.8
5684	" 22	" 23	d	c	.02	387.6	237.2	50.4	58.	34.8	43.	12.5	10.5	2.	.24	.544	.272	.272	1.24	.824	.416	.12	1.4
5741	" 29	" 30	d	c	.15	375.2	345.2	30.	36.8	36.8	44.	13.	9.1	3.9	.272	.576	.288	.288	1.48	.712	.768	.08	1.
5794	Sept. 5	Sept. 6	d	c	.04	392.4	367.6	24.8	36.4	36.4	50.2	10.8	7.2	3.6	.368	.416	.304	.112	1.08	.856	.224	.12	1.08
5840	" 12	" 13	d	c	.1	393.2	360.4	32.8	37.2	34.4	54.5	11.6	10.8	.8	.24	.512	.384	.128	1.4	.76	.64	.09	1.16
5890	" 19	" 20	d	l	.03	390.8	368.4	22.4	58.	54.4	54.7	11.7	7.5	4.2	.168	.64	.336	.304	1.32	.824	.496	.12	1.08
5944	" 26	" 27	d	c	.04	383.6	368.	15.6	45.6	36.	58.	10.1	8.3	1.8	.128	.512	.416	.096	1.028	.804	.224	.17	1.16
5992	Oct. 3	Oct. 4	d	c	.2	392.8	384.8	8.	37.2	36.8	69.	11.	9.3	1.7	.128	.592	.336	.256	1.46	.708	.752	.85	3.2
6037	" 10	" 11	d	c	.1	408.	391.6	16.4	34.	34.	66.5	11.4	9.6	1.8	.192	.688	.336	.352	1.464	.708	.756	.75	4.4
6087	" 17	" 18	d	c	.03	410.	392.4	17.6	39.6	12.8	67.	9.8	8.8	1.	.256	.464	.4	.064	1.32	.808	.512	1.	3.68
6151	" 24	" 25	d	c	.08	444.8	414.8	30.	27.6	14.8	72.5	10.5	8.8	1.7	1.12	.64	.24	.4	1.32	.584	.736	1.5	4.
6197	" 31	Nov. 1	d	l	.03	421.8	407.6	13.6	29.2	....	62.	8.7	8.2	.5	1.44	.48	.304	.176	.968	.52	.448	1.35	3.6
6247	Nov. 7	" 8	d	l	.04*.15	404.8	389.2	15.6	23.6	22.8	55.	6.5	6.1	.4	3.2	.384	.304	.08	.52	.424	.096	.35	2.6
6295	" 14	" 15	d	l	.03	398.8	380.8	18.	45.2	44.8	54.	7.1	6.6	.5	3.2	.416	.288	.128	.872	.552	.32	.1	1.
6339	" 21	" 22	d	c	.03	372.4	354.4	18.	31.2	22.	50.5	7.1	6.4	.7	3.52	.48	.288	.192	.92	.68	.24	.07	1.6
6408	" 28	" 29	d	l	.03	350.4	348.	2.4	45.6	44.8	34.	7.2	7.2	0.0	1.92	.32	.176	.144	.776	.552	.224	.06	1.84
6448	Dec. 5	Dec. 6	d	l	.02	385.6	364.4	21.2	48.4	40.8	36.	7.7	6.7	1.	1.6	.432	.256	.176	.936	.52	.416	.08	2.8
6502	" 12	" 13	d	l	.04	380.	376.4	3.6	44.4	40.8	39.5	9.1	8.3	.8	1.4	.48	.4	.08	1.	.68	.32	.08	2.32
6551	" 19	" 20	d	c	.05	374.4	358.4	16.	41.6	41.6	41.	9.6	8.9	.7	4.	.48	.432	.048	1.	.808	.192	.08	1.4
6577	" 26	" 27	d	c	.04	376.4	372.	4.4	31.2	28.4	33.7	9.9	9.4	.5	3.36	.432	.336	.096	.84	.68	.16	.07	2.2
Average Jan. 3—June 27						349.6	285.4	64.2	48.2	40.4	14.5	14.2	9.8	4.4	.865	.497	.333	.164	1.09	.728	.366	.059	1.14
Average July 3—Dec. 26						390.6	372.9	17.7	43.9	39.3	47.2	10.4	9.	1.4	1.173	.492	.317	.175	1.124	.717	.407	.338	1.94
Average Jan. 3—Dec. 26						370.9	36.9	43.9	46.	39.8	31.5	12.9	9.4	2.8	1.025	.494	.325	.169	1.11	.722	.387	.204	1.55

*n. f. Odor none. Color on ignition generally brown, but in latter part of year sometimes gray.

CHEMICAL EXAMINATION OF WATER IN THE ILLINOIS RIVER AT AVERYVILLE.

(Parts per 1,000,000.)

Serial Number.	1898 Date of		Appearance.			Residue on Evaporation.					Chlorine.	Oxygen Consumed.			Nitrogen as Ammonia				Organic Nitrogen.			Nitrogen as	
	Collection.	Examination.	Turbidity.	Sediment.	Color.	Total.	Dissolved.	Suspended.	Loss on Ignition. Total.	Loss on Ignition. Dissolved.		Total.	By Dissolved.	By Suspended Matt'r	Free Ammonia.	Albuminoid Ammonia. Total.	Albuminoid Ammonia. Dissolved.	Albuminoid Ammonia. Suspended	Total.	Dissolved.	Suspended	Nitrites.	Nitrates.
3123	Jan. 3	Jan. 4	d	c	08*.12	402.8	396.8	6.	24.	14.	45.	7.3	6.9	.5	4.4	.48	.4	.8	.93	.77	.16	.01	1.3
3148	“ 10	“ 11	d	c	.06	448.	425.6	22.4	23.2	16.8	48.	9	7.3	1.7	4.6	.48	.4	.08	.92	.76	.16	.175	1.1
3169	“ 17	“ 18	d	c	.06	300.	376.	24.	36.	26.8	37.	11.	7.5	3.5	3.84	.44	.36	.08	1.16	.84	.32	.12	1.4
3205	“ 23	“ 24	d	c	.2	346.	310.	36.	30.	18.8	26.	12.6	8.2	4.4	2.6	.56	.4	.16	1.08	.68	.4	.1	1.
3220	“ 31	Feb. 1	d	c	.4	314.8	306.	8.8	28.	24.	17.	10.6	7.8	2.8	1.68	.52	.32	.2	.84	.68	.16	.12	2.75
3265	Feb. 14	“ 15	d	c	.2	375.2	283.2	92.	29.2	26.	12.	14.	7.8	6.2	1.44	.8	.68	.12	1.	.72	.28	.05	2.2
3288	“ 21	“ 22	d	c	.6	277.2	250.	27.2	32.8	30.	8.	10.9	7.8	3.1	.64	.48	.352	.128	.92	.76	.16	.01	2.4
3312	“ 28	Mar. 1	d	c	.5	298.8	273.2	25.6	42.	30.4	9.	9.4	8.6	.8	.64	.48	.4	.08	.76	.64	.12	.02	1.15
3328	Mar. 7	“ 8	d	c	.4	264.	255.2	8.8	27.2	16.4	9.	10.8	8.6	2.2	.6	.4	.36	.04	1.	.68	.32	.02	1.1
3353	“ 14	“ 15	d	c	.2	304.4	241.6	62.8	34.	28.	7.	10.7	6.9	3.8	.6	.48	.32	.16	.92	.72	.2	.035	1.05
3377	“ 21	“ 22	d	c	.6	298.4	225.2	73.2	26.	20.	5.	13.	9.3	3.7	.4	.52	.36	.16	.92	.64	.28	.035	.8
3400	“ 28	“ 29	d	c	.4	286.	230.4	55.6	36.8	30.	4.6	13.5	8.9	4.6	.24	.52	.36	.16	1.25	.73	.52	.052	1.25
3434	Apr. 4	Apr. 6	d	c	.6	298.8	188.4	110.4	32.4	20.	5.	15.8	10.4	5.4	.184	.64	.4	.24	1.09	.65	.44	.02	1.15
3448	“ 11	“ 12	d	1	.2	257.6	238.	19.6	32.2	29.6	5.	9.9	9.4	.5	.2	.44	.4	.04	.93	.85	.08	.035	.9
3470	“ 18	“ 19	d	c	......	257.2	246.8	10.4	32.	30.	7.6	11.9	10.9	1.	.208	.416	.384	.032	1.17	.85	.32	.04	1.
3495	“ 25	“ 26	d	1	.07 .1	285.6	275.6	10.	32.4	30.4	9.	11.6	8.7	2.9	.36	.44	.28	.16	1.01	.73	.28	.05	1.
3525	May 2	May 3	d	1	.06*.1	300.4	292.	8.4	27.6	26.	12.	8.6	8.2	.4	.32	.44	.36	.08	.84	.74	.1	.06	.7
3550	“ 9	“ 10	d	1	.1*.15	317.2	311.2	6.	54.8	46.8	12.	8.7	8.2	.5	.2	.48	.44	.04	.9	.74	.16	.1	.8
3579	“ 16	“ 17	d	1	.05	376.4	314.	62.4	82.	78.8	14.	9.	8.1	.9	.24	.48	.36	.12	1.06	.78	.28	.09	1.1
3610	“ 23	“ 24	d	1	.15	318.4	276.	42.4	48.	46.	10.	11.3	8.4	2.9	.24	.44	.36	.08	.98	.62	.36	.1	.8
3631	“ 30	“ 31	d	c	.15	284.	270.2	8.8	42.	36.	7.	11.8	8.8	3.	.12	.32	.24	.08	.82	.62	.2	.16	8.5
3657	June 6	June 7	d	1	.04*.1	288.	278.8	9.2	44.	34.8	9.	8.5	7.9	.6	.16	.34	.32	.02	.6	.52	.08	.16	.5
3685	“ 13	“ 14	d	1	.08	324.4	286.	38.4	34.	28.4	11.	8.	7.1	.9	.11	.32	.29	.04	.72	.64	.08	.15	.55
3706	“ 20	“ 21	d	1	.02	323.6	310.8	12.8	33.2	31.2	13.	7.8	7.6	.2	.24	.28	.24	.04	.6	.56	.04	.25	.45
3749	“ 27	“ 28	s	1	.05	298.4	294.	4.4	28.8	24.	14.	8.4	7.5	.9	.24	.4	.36	.04	.6	.52	.08	.15	.35
3775	July 4	July 5	s	1	.15	260.	201.2	8.8	28.	27.2	15.	7.8	6.7	1.1	.24	.3	.28	.02	.68	.64	.04	.32	5.
3807	“ 11	“ 12	d	1	.06*.3	313.2	292.	21.2	20.8	17.2	14.	8.8	8.2	.6	.12	.4	.36	.04	.84	.76	.08	.12	.3

CHEMICAL EXAMINATION OF WATER IN THE ILLINOIS RIVER AT AVERYVILLE.—CONTINUED.
(Parts per 1,000,000.)

Serial Number.	1898 Date of Collection.	1898 Date of Examination.	Appearance. Turbidity.	Appearance. Sediment.	Appearance. Color.	Residue on Evaporation. Total.	Residue on Evaporation. Dissolved.	Residue on Evaporation. Suspended.	Loss on Ignition. Total.	Loss on Ignition. Dissolved.	Chlorine.	Oxygen Consumed. Total.	Oxygen Consumed. By Dissolved.	Oxygen Consumed. By Suspended Matt'r	Nitrogen as Ammonia. Free Ammonia.	Albuminoid Ammonia. Total.	Albuminoid Ammonia. Dissolved.	Albuminoid Ammonia. Suspended	Organic Nitrogen. Total.	Organic Nitrogen. Dissolved.	Organic Nitrogen. Suspended	Nitrogen as Nitrites.	Nitrogen as Nitrates.
3839	“ 18	“ 19	d	1	.03*.1	337.2	313.6	23.6	22.	18.	17.	9.5	8.8	.7	.136	.48	.4	.08	1.12	.88	.24	.07	.2
3875	“ 20	“ 26	d	c	.04*.3	340.8	313.9	27.2	20.	18.8	24.	12.2	8.8	3.4	.44	.52	.4	.12	1.08	.84	.24	.06	.25
3897	Aug. 1	Aug. 2	d	c	03*.06	371.6	346.8	24.8	18.	17.2	32.	8.3	8.	.3	.104	.36	.28	.08	.96	.68	.28	.105	.4
3928	“ 8	“ 9	d	c	.04	383.2	359.6	23.6	31.2	26.	42.	8.5	8.	.5	.16	.4	.32	.08	.8	.64	.16	.21	.2
3955	“ 13	“ 16	d	c	.04	418.8	387.6	31.2	61.6	50.	47.	9.9	8.3	1.6	.28	.4	.36	.04	.8	.72	.08	.4	.3
3978	“ 22	“ 23	d	c	.04*.3	392.8	372.8	20.	42.	40.	56.	9.1	8.	1.1	.32	.44	.36	.08	.8	.68	.12	1.	.55
4010	“ 27	“ 30	d	1	.04*.1	324.	298.8	25.2	36.	34.	30.	7.1	6.8	.3	.52	.28	.24	.04	.68	.56	.12	.25	.3
4050	6	Sept. 7	d	c	....	370.4	322.	48.4	31.2	26.	37.	8.9	6.1	2.8	.32	.4	.28	.12	.72	.52	.2	.2	.65
4068	“ 12	“ 13	d	c	.04	368.	337.2	30.8	58.	56.	35.	8.3	5.6	2.7	.72	.28	.2	.08	.8	.56	.24	.14	.35
4087	“ 19	“ 20	d	c	.05	336.	319.6	6.	44.	38.	35.	8.7	6.	2.7	.64	.32	.24	.08	.72	.56	.16	.14	.35
4121	“ 26	“ 27	d	c	.04	341.2	331.6	19.6	66.	60.	33.	7.4	6.4	1.	.48	.3	.24	.06	.64	.56	.08	.14	.45
4160	Oct. 2	Oct. 4	d	c	.04	355.2	323.2	32.	30.	27.2	30.	7.8	6.	1.8	.24	.36	.3	.06	.64	.44	.2	.15	.6
4187	“ 10	“ 11	d	c	.08	466.	337.2	28.8	40.	32.	30.	6.9	6.	.9	.16	.28	.22	.06	.56	.4	.16	.36	.6
4225	“ 17	“ 18	d	c	.04	396.8	364.8	32.	44.	43.6	40.	7.8	5.8	2.	1.2	.32	.224	.096	.65	.53	.12	.13	.75
4202	“ 24	“ 25	d	1	.04	396.	364.	32.	41.2	38.	42.	7.7	5.7	2.	2.4	.32	.224	.096	.65	.53	.12	.06	.6
4293	“ 31	“ 1	d	1	.1	342.	324.	18.		30.	27.	6.6	6.	.6	1.48	.32	.24	.08	.61	.49	.12	.05	.6
4327	7	Nov. 8	d	1	.06*.1	362.	344.8	17.2	40.	32.	20.	6.7	5.2	1.5	.92	26	.2	.06	.59	.51	.08	.06	.9
4362	“ 14	“ 15	d	1	.04	382.	375.6	6.4	30.	28.8	23.	6.9	6.2	.7	1.16	.28	.24	.04	.55	.47	.08	.075	.8
4393	“ 21	“ 22	d	c	.06	356.	313.8	37.2	30.	24.	13.	8.	6.	2.	.52	.304	.208	.096	.71	.59	.12	.035	1.
4423	“ 28	“ 29	d	1	.07*.3	354.	344.	10.	60.	56.	12.	7.3	6.8	.5	.6	.304	.192	.112	.63	.47	.16	.04	1.35
4452	5	Dec. 6	d	1	04*.05	390.8	376.	12.8	48.8	48.	19.	7.7	7.	.7	.88	.24	.144	.096	.69	.53	.16	.035	.9
4479	“ 12	“ 13	d	1	03*.05	386.	373.6	12.4	47.2	44.	18.	8.3	7.5	.8	1.08	.32	.24	.08	.69	.57	.12	.026	.3
4498	“ 19	“ 20	s	1	.1*.15	397.6	392.4	5.2	60.8	57.2	23.	9.3	8.5	.8	1.68	.368	.304	.064	.77	.65	.12	.02	.25
4028	“ 26	“ 27	s	1	.1*.2	396.8	384.8	12.	62.	58.	25.	8.8	8.	.8	2.66	.4	.288	.112	.93	.77	.16	.035	.15
Average Jan. 3—June 27						317.8	286.4	31.4	35.7	29.7	14.2	10.5	8.2	2.2	.98	.463	.365	.098	.92	.69	.22	.084	1.1
Average July 4—Dec. 26						262.6	341.2	21.4	35.7	29.7	28.4	8.2	6.89	1.3	.745	.344	.268	.075	.74	.59	.14	.162	.52
Average Jan. 4—Dec. 26						340.6	314.3	26.3	38.1	33.1	21.4	9.3	7.5	1.7	.86	.403	.316	.087	.83	.64	.18	.124	.8

*Not filtered. Odor none. Color upon ignition brown.

CHEMICAL EXAMINATION OF WATER FROM THE ILLINOIS RIVER AT AVERYVILLE.
(Parts per 1,000,000.)

Serial Number.	1900 Date of		Appearance.			Residue on Evaporation.					Chlorine.	Oxygen Consumed.			Nitrogen as Ammonia				Organic Nitrogen.			Nitrogen as	
	Collection.	Examination.	Turbidity.	Sediment.	Color.	Total.	Dissolved.	Suspended.	Loss on Ignition. Total.	Loss on Ignition. Dissolved.		Total.	By Dissolved.	By Suspended Matt'r	Free Ammonia.	Albuminoid Ammonia. Total.	Albuminoid Ammonia. Dissolved.	Albuminoid Ammonia. Suspended	Total.	Dissolved.	Suspended	Nitrites.	Nitrates.
6603	Jan. 2	Jan. 3	d	l	.03*1.	375.6	370.8	4.8	46.8	40.9	22.5	9.6	8.6	1.	1.92	.352	.272	.08	.904	.584	.32	.04	3.44
6650	" 9	" 10	d	l	.04	369.6	364.4	5.2	60.8	60.4	26.	8.3	1.8	.5	2.	.384.	.32	.064	.76	.6	.16	.04	3.4
6695	" 16	" 17	d	c	.06	384.	382.4	1.6	41.2	39.6	32.	9.	8.5	.5	2.96	.432	.368	.064	1.056	.8	.256	.065	2.8
6740	" 23	" 20	d	c	.2	351.2	302.	49.2	41.6	34.4	22.	12.3	8.9	3.4	2.	.4	.32	.08	1.024	.544	.48	.03	1.52
6789	" 30	" 31	d	c	.1	307.6	221.6	86.	37.6	26.4	22.	9.2	8.7	.5	2.48	.48	.336	.144	.96	.608	.352	.025	1.8
6847	Feb. 6	Feb. 7	d	l	.04	267.2	265.6	1.6	28.8	28.	18.	6.5	6.3	.2	1.44	.272	.192	.08	.56	.448	.112	.025	1.4
6898	" 13	" 14	vd	vm	.3	476.4	178.8	297.6	48.	24.8	9.	19.4	8.3	11.1	.736	.704	.288	.416	1.76	.416	1.344	.025	2.
6941	" 20	" 21	vd	c	.2	328.4	223.6	104.8	75.2	29.6	10.	12.	9.9	2.1	1.04	.448	.384	.064	1.12	.608	.512	.03	2.2
6995	" 27	Mar. 3	vd	c	.03	343.2	281.2	62.	20.8	20.4	12.	12.8	9.4	3.4	1.024	.416	.208	.208	.8	.576	.224	.027	1.6
7023	Mar. 6	" 7	d	l	.4	255.6	242.8	12.8	14.4	10.8	11.7	11.	8.8	2.2	.864	.32	.288	.032	.88	.64	.24	.02	2.2
7078	" 13	" 14	d	m	.4	327.6	189.6	138.	27.2	17.6	8.4	12.6	7.1	5.5	.96	.384	.288	.096	1.12	.544	.576	.016	1.44
7124	" 20	" 21	d	m	.5	292.	115.6	176.4	30.4	16.4	6.7	14.3	11.9	2.4	.384	.48	.272	.208	1.24	.6	.64	.015	1.
7170	" 27	" 28	d	c	.6	200.4	158.4	42.	27.7	14.4	5.2	10.5	8.1	2.4	.48	.288	.256	.032	1.	.632	.368	.014	1.6
7219	Apr. 3	Apr. 4	d	c	.4	234.8	176.4	58.4	23.2	14.4	6.2	10.8	8.2	2.6	.432	.352	.288	.064	.824	.664	.14	.016	1.52
7274	" 10	" 11	d	c	.3	268.4	180.4	88.	22.4	19.2	5.6	13.7	7.7	6.	.352	.336	.24	.096	.824	.632	.192	.03	2.6
7336	" 17	" 18	d	c	.2	230.4	214.	16.4	19.2	17.6	8.1	8.7	8.5	.2	.432	.256	.208	.048	.76	.568	.192	.038	2.
7402	" 24	" 25	d	c	....	264.8	246.8	18.	30.8	20.8	9.	9.	8.	1.	.32	.448	.256	.192	1.016	.632	.384	.045	2.12
7442	May 1	May 2	d	c	.07	285.2	266.4	18.8	43.2	24.8	11.	9.	8.	1.	.112	.432	.24	.192	.932	.644	.288	.06	1.76
7478	" 8	" 9	d	l	.2	270.	258.8	11.2	25.6	23.6	11.6	12.9	8.	4.9	.16	.512	.352	.16	1.092	.644	.448	.07	1.08
7549	" 16	" 17	d	.....	.1	294.8	267.6	27.2	49.2	38.8	14.7	8.3	9.	.3	.384	.64	.288	.352	1.252	.676	.576	.125	1.08
7589	" 22	" 23	s	l	.1	296.8	268.4	28.4	40.4	28.4	16.	10.8	7.2	3.6	.304	.32	.24	.08	.676	.484	.192	.1	1.28
7621	" 29	" 30	d	c	.15	322.	255.6	66.4	26.	26.	16.	8.6	6.	.6	.24	.416	.24	.176	.84	.64	.2	.07	1.2
7656	June 5	June 6	d	c	.04	256.4	242.8	13.6	42.4	41.6	19.	7.	8.7	.3	.384	.304	.272	.032	.64	.452	.188	.16	1.4
7707	" 12	" 13	d	l	.04	262.8	242.	20.8	18.6	19.9	16.	6.6	6.5	.1	.224	.24	.208	.032	.58	.52	.06	.2	2.08
7742	" 19	" 20	d	c	.01	322.	288.4	33.6	37.6	34.4	20.	9.3	6.5	2.8	.256	.272	.182	.08	.66	.58	.08	.14	1.48
7779	" 26	" 27	l	s	.07	281.6	260.	21.6	25.2	21.2	20.	7.	6.8	.2	.56	.256	.16	.096	.74	....		.11	1.16
7818	July 3	July 4	d	l	.03	282.	253.6	28.4	26.	25.2	20.5	7.9	7.	9.	.352	.324	.208	.116	.612	.34	.272	.19	1.48
7896	" 10	" 11	d	l	.1	302.4	260.8	41.6	42.	25.2	20.	6.	5.8	.2	.128	.208	.16	.048	.564	.388	.176	.125	1.44
7945	" 17	" 18	c	l	.02	283.2	256.	27.2	25.2	24.4	27.	6.2	5.8	.4	.288	.176	.08	096	......		....	.22	2. ......
8013	" 24	" 25	d	l	.01	248.8	231.2	17.6	30.4	30.4	23.	6.3	4.5	1.8	.144	.224	.112	.112	.596	.42	.176	.12	1.32

Chemical Examination of Water from the Illinois River at Averyville.—Continued.
(Parts per 1,000,000.)

Serial Number.	1900 Date of Collection.	Date of Examination.	Appearance. Turbidity.	Sediment.	Color.	Residue on Evaporation. Total.	Dissolved.	Suspended.	Loss on Ignition. Total.	Loss on Ignition. Dis-solved.	Chlorine.	Oxygen Consumed. Total.	By Dis-solved.	By Suspended Matt'r	Nitrogen as Ammonia Free Ammonia.	Albuminoid Ammonia Total.	Dis-solved.	Sus-pended	Organic Nitrogen. Total.	Dissolved.	Suspended	Nitrogen as Nitrites.	Nitrates.
8063	July 31	Aug. 1	d	l	.01	258.8	234.8	24.	41.2	34.8	22.	5.5	4.4	1.1	.07	.208	.176	.032	.708	.548	.16	.22	.92
8107	Aug. 7	" 7	d	l	.01	219.2	215.6	63.6	40.	40.	19.	6.	.....	...	.176	.272	.176	.096	.708	.468	.24	.12	1.12
8175	" 14	" 15	d	l	.01	344.	135.2	8.4	46.8	36.4	21.	5.3	4.6	.7	.08	.272	.176	.096	.452	.348	.104	.125	1.12
8234	" 21	" 21	d	l	.01	223.6	197.2	26.4	38.	20.4	25.	5.7	4.4	1.3	.32	.272	.192	.08	.54	.284	.256	.13	1.12
8309	" 27	" 28	d	l	.02	250.	220.4	29.6	19.2	18.4	20.	6.7	4.6	2.1	.176	.24	.144	.096	.636	.38	.256	.1	1.12
8358	Sept. 4	Sept. 4	d	c	.02	264.8	260.8	4.	18.	16.8	22.	6.4	4.6	1.8	.175	.272	1.92	.08	.456	.....	..	.23	1.52
8437	" 11	" 11	d	l	.02	264.	299.6	34.4	16.4	15.2	18.	7.4	4.5	2.8	.128	.256	.128	.128	.536	.384	.152	.075	1.04
8486	" 18	" 18	d	c	.01	272.8	253.2	19.6	36.8	15.6	20.	7.5	6.1	1.4	.144	.32	.224	.096	.....	.....	...	.01	1.2
8535	" 25	" 25	d	l	.05	318.	286.8	31.2	39.2	38.4	30.	8.5	6.4	2.1	.864	.352	.16	1.92	.636	.....	....	.13	1.44
8597	Oct. 2	Oct. 2	d	l	.02	317.6	294.4	23.2	25.6	23.2	37.	6.7	5.8	.9	1.28	.416	.224	.192	.656	.48	.176	.15	4.28
8645	" 9	" 9	d	l	.02	238.	225.6	12.4	25.6	24.	2.3	4.6	4.1	.5	.432	.24	.224	.016	.704	.464	.24	.13	1.59
8672	" 16	" 17	v	m	.01	242.8	216.4	26.4	25.6	24.	20.	5.9	5.4	.5	.32	.224	.192	.032	.512	.48	.032	.41	1.45
8697	" 24	" 25	d	l	.01	244.4	226.	18.4	24.4	22.8	20.	6.6	5.8	.8	.616	.256	.192	.064	.704	.542	.192	.03	4.44
8726	" 30	" 31	d	l	.....	250.	234.	16.	25.6	24.4	21.	5.3	4.9	.4	.418	.16	.16	.00	.608	.608	.00	.05	1.51
8743	Nov. 6	Nov. 7	d	l	.02	247.2	232.8	14.4	23.2	21.6	21.	5.4	4.9	.5	.384	.288	.192	.096	.592	.48	.412	.055	1.665
8775	" 13	" 13	d	l	.01*.04	238.8	236.4	2.4	20.8	18.8	22.	5.8	5.4	.4	.704	.32	.288	.032	.656	.624	.032	.1	.1
8794	" 20	" 20	d	l	.03	220.	215.2	4.8	16.	12.4	17.5	5.3	4.7	.6	....	.224	.192	.032	.416	.....	..	.036	1.544
8832	" 27	" 28	d	l	.05	269.6	250.8	18.8	27.2	23.2	13.	5.6	5.4	.2	.56	.24	.16	.08	.56	.4	.16	.04	1.2
8854	Dec. 4	Dec. 4	d	l	.1	286.8	272.8	14.	26.	23.6	13.	7.2	6.2	1.	.76	.24	....	....	.528	.496	.032	.04	2.28
8887	" 11	" 12	d	l	.15	270.4	265.6	4.8	23.6	20.	13.	7.4	.....	.....	.272	.224	.192	.032	.528	.48	.04	.034	1.566
8903	" 18	" 19	d	l	.2	269.2	255.6	13.6	26.4	23.2	113.	7.6	7.4	.2	1.12	.204	.288	.016	.688	.64	.048	.024	1.826
8923	" 26	" 26	d	l	.2	267.2	258.	9.2	21.6	17.6	14.	8.3	8.	.3	.912	.16	.152	.008	.752	.64	.112	.015	1.425
Average Jan. 2–June 26						302.6	248.6	54.	34.8	26.6	14.3	10.3	7.7	2.6	.863	.39	.268	.121	.923	.589	.334	.59	1.81
Average July.3–Dec. 24						253.6	241.8	11.7	28.1	23.8	20.	6.4	5.5	.9	.434	.257	.183	.074	.597	.448	.149	.1	4.354
Average Jan. 2–Dec. 24						281.9	245.2	36.7	31.4	25.2	17.5	8.4	6.6	1.7	.65	.323	.222	.101	.767	.593	.243	.077	1.584

*n. f. Usually this water possesses no odor, but upon July 17th and Dec. 11th, 18th and 26th a musty odor was noticeable. The color upon ignition was almost always brownish.

CHEMICAL EXAMINATION OF WATER FROM THE ILLINOIS RIVER AT HAVANA.
(Parts per 1,000,000.)

Serial Number.	1897 Date of Collection.	1897 Date of Examination.	Appearance. Turbidity.	Appearance. Sediment.	Appearance. Color.	Residue on Evaporation. Total.	Residue on Evaporation. Dissolved.	Residue on Evaporation. Suspended.	Residue on Evaporation. Loss on Ignition. Total.	Residue on Evaporation. Loss on Ignition. Dissolved.	Chlorine.	Oxygen Consumed. Total.	Oxygen Consumed. By Dissolved.	Oxygen Consumed. By Suspended Matt'r	Nitrogen as Ammonia. Free Ammonia.	Nitrogen as Ammonia. Albuminoid Ammonia. Total.	Nitrogen as Ammonia. Albuminoid Ammonia. Dissolved.	Nitrogen as Ammonia. Albuminoid Ammonia. Suspended	Organic Nitrogen. Total.	Organic Nitrogen. Dissolved.	Organic Nitrogen. Suspended	Nitrogen as Nitrites.	Nitrogen as Nitrates.
1800	Jan. 6	Jan. 6	v	m	....	504.4	259.6	244.8	25.2	20.	10.	15.7	8.5	7.2	.6	.56	.36	.2	1.4	.88	.52	.04	2.
1821	" 13	" 13	v	c	....	329.6	259.6	70.	25.2	10.	10.	13.7	......	.....	.44	.44	......	.....	.96	......	.....	.035	2.8
1841	" 20	" 20	v	c	....	294.4	270.8	23.6	18.	16.8	8.	8.2	......	.....	.32	.36	......	.....	.8	......	.....	.035	3.5
1849	" 26	" 27	s	l	.3	294.	293.2	.8	21.2	14.8	4.3	6.5	......		.08	.2	......	.....	.64	......	.....	.025	3.6
1877	Feb. 2	Feb. 3	d	l	....	308.8	307.6	1.2	9.2	9.2	8.	9.7	......	.....	.352	.32	......	.....	.8	......	.....	.022	3.5
1900	" 9	" 10	d	l	.2	333.2	321.6	11.6	12.	11.2	10.	10.1	......	.....	.68	.4	......	.....	.8	......	.....	.035	3.
1921	" 16	" 17	d	c	....	338.	318.8	19.2	18.	13.2	12.	10.4	......	.....	.88	.36	......	.....	.8	......	.....	.05	2.4
1939	" 23	" 24	d	c	....	322.	298.8	23.2	47.2	34.	11.	9.5	......	.....	.8	.48	......	.....	.8	......	.....	.055	2.
1960	Mar. 2	Mar. 3	d	l	....	289.6	256.4	33.2	44.	31.2	8.	8.2	......	.....	.48	.28	......	.....	.63	......	.....	.07	2.9
1981	" 9	" 10	d	c	....	283.2	258.8	24.4	48.8	35.6	7.	8.	......	.....	.48	.36	......	.....	.6	......	.....	.03	2.4
2018	" 16	" 17	d	l	....	261.2	246.8	14.4	49.6	43.2	7.	9.5	......	.....	.32	.32	......	.....	.67	......	.....	.05	2.8
2040	" 24	" 24	d	c	....	274.8	257.2	17.6	42.8	34.8	6.	7.8	......	.....	.112	.2	......	.....	.51	......	.....	.07	3.5
2060	" 30	" 31	d	c	....	277.6	256.	21.6	45.6	37.2	4.	6.4	......	.....	.048	.2	......	.....	.51	......	.....	.04	3.5
2095	Apr. 6	Apr. 7	d	c	....	261.6	231.2	30.4	37.6	26.4	4.	10.4	......	.....	.168	.32	......	.....	.67	......	.....	.07	2.8
2117	" 13	" 14	d	l	....	259.6	242.4	17.2	37.6	32.	4.4	8.8	......	.....	.136	.32	......	.....	.67	......	.....	.06	2.4
2134	" 20	" 21	d	l	.2	292.	270.8	21.2	50.	41.6	7.	8.9	......	.....	.064	.36	......	.....	.83	......	.....	.055	2.2
2162	" 28	" 28	d	c	....	315.2	273.6	41.6	39.2	33.6	9.	10.3	......	.....	.096	.44	......	.....	.95	......	.....	.065	2.
2189	May 4	May 5	d	c	....	316.	296.	20.	41.2	39.2	10.	12.	......	.....	.072	.52	......	.....	.95	......	.....	.095	1.5
2209	" 11	" 12	d	l	.15	304.8	283.2	21.6	25.2	22.	10.	10.7	......	.....	.07	.44	......	.....	.71	......	.....	.08	1.8
2232	" 18	" 19	d	l	.1	296.8	293.6	3.2	32.	22.8	10.	9.2	......	.....	.072	.36	......	.....	.83	......	.....	.075	1.4
2259	" 25	" 26	d	l	....	334.8	320.	14.8	34.	28.	12.	11.	......	.....	.28	.44	......	.....	1.07	......	.....	.1	1.1
2285	June 1	June 2	d	c	....	347.6	314.8	32.8	49.2	22.8	13.	9.	......	.....	.52	.52	......	.....	1.	......	.....	.25	.9
2308	" 8	" 9	d	l	....	340.4	326.8	13.6	23.2	19.6	15.	11.9	......	.....	.56	.36	......	.....	1.01	......	.....	.35	1.2
2331	" 15	" 16	d	c	....	347.2	328.	19.2	36.	32.	17.	12.5	......	.....	1.	.56	......	.....	1.05	......	.....	.37	.8
2365	" 22	" 23	d	c	....	384.	335.6	48.4	30.	28.8	22.	11.9	......	.....	.88	.8	......	.....	1.17	......	.....	.3	1.4
2388	" 29	" 30	d	c	....	348.	247.6	100.4	54.	35.2	9.	11.3	......	.....	.28	.44	......	.....	.93	......	.....	.27	1.5
2421	July 6	July 8	d	c	....	391.6	292.	99.6	73.2	35.6	11.	11.2	8.8	2.4	.88	.44	.32	.12	.92	.48	.44	.4	1.6
2443	" 13	" 15	d	l	.3	318	286.	32.	28.	24.	15.	12.7	8.7	4.	.36	.44	.352	.088	.96	.92	.04	.3	1.1

CHEMICAL EXAMINATION OF WATER FROM THE ILLINOIS RIVER AT HAVANA.—CONTINUED.
(Parts per 1,000,000.)

Serial Number.	1897 Date of Collection.	1897 Date of Examination	Appearance. Turbidity.	Appearance. Sediment.	Appearance. Color.	Residue on Evaporation. Total.	Residue on Evaporation. Dissolved.	Residue on Evaporation. Suspended.	Loss on Ignition. Total.	Loss on Ignition. Dissolved.	Chlorine.	Oxygen Consumed. Total.	Oxygen Consumed. By Dissolved.	Oxygen Consumed. By Suspended Matt'r	Nitrogen as Ammonia. Free Ammonia.	Albuminoid Ammonia. Total.	Albuminoid Ammonia. Dissolved.	Albuminoid Ammonia. Suspended	Organic Nitrogen. Total.	Organic Nitrogen. Dissolved.	Organic Nitrogen. Suspended	Nitrogen as Nitrites.	Nitrogen as Nitrates.
2472	July 21	July 21	d	1	.2	306.	290.4	15.6	32.	29.2	15.	10.8	8.9	1.9	.8	.72	.384	.336	1.8	.68	1.12	.23	.8
2497	" 28	" 28	d	c	.1	369.2	328.	41.2	20.4	18.4	23.	14.	12.7	1.3	.498	.52	.49	.03	1.04	.68	.36	.38	1.1
2527	Aug. 4	Aug. 4	d	c	.07	340.	268.	72.	24.	14.	22.	12.8	9.5	3.3	.4	.4	.352	.028	1.4	1.08	.32	.27	1.
2545	" 11	" 11	d	c	.15	428.	296.8	131.3	20.	17.6	21.	15.8	11.5	4.3	.72	.64	.512	.128	1.4	1.	.4	.24	1.
2574	" 18	" 18		c	.15	317.6	277.2	40.4	17.6	10.	22.	12.5	11.	1.5	.72	.56	.32	.24	1.16	.92	.24	.26	.5
2595	" 25	" 25	d	c	.04	416.4	312.4	104.	16.8	14.4	29.	12.8	11.5	1.3	.48	...	.416	...	1.3	.82	.48	.4	.9
2619	Sept. 1	Sept. 1	d	c	.15	442.4	322.	120.4	26.	24.	33.	13.2	9.5	3.7	.48	.52	.32	.2	1.14	.74	.4	.16	.3
2648	" 8	" 8	d	c	.1	393.2	302.4	90.8	23.2	18.4	35.	12.	10.5	1.5	.48	.52	.36	.16	1.06	.78	.28	.11	.3
2673	" 15	" 15	d	c	.2	365.6	347.2	18.4	23.6	20.	48.	12.7	11.7	1.	.8	.56	.44	.12	.98	.9	.08	.07	.6
2701	" 22	" 22	d	c	.1	384.8	337.2	47.5	14.	13.2	47.	13.	11.4	1.6	.8	.64	.44	.2	1.3	.86	.44	.07	.7
2727	" 29	" 29	d	c	.1	388.4	342.8	45.6	25.2	8.	50.	12.5	10.5	2.	.56	.64	.48	.16	1.26	.94	.32	.37	1.
2761	Oct. 6	Oct. 6	d	c	.15	344.8	313.2	31.6	26.	22.	42.	11.3	9.5	1.8	.56	.6	.4	.2	1.18	1.02	.16	.15	.4
2789	" 13	" 13	d	c	....	414.8	352.	62.8	24.	22.	54.	12.6	12.5	.1	1.	.56	.48	.08	1.1	.94	.16	.15	.2
2825	" 20	" 20	d	1	.05	403.2	360.4	42.8	28.4	26.4	55.	12.	8.8	3.2	.96	.6	.4	.2	1.02	.78	.24	.55	.7
2847	" 27	" 27	d	1	.3 *.2	408.8	377.2	31.6	22.4	20.8	60.	10.6	9.4	1.2	1.08	.52	.4	.12	1.02	.9	.12	1.	1.7
2880	Nov. 3	Nov. 3	d	1	.1	390.	363.2	26.8	32.8	32.	58.	11.8	10.5	1.3	1.16	.44	.32	.12	.94	.7	.24	1.	.8
2921	" 10	" 11	d	1	.07	400.4	374.8	25.6	30.8	26.8	58.	11.4	10.5	.9	1.28	.48	.4	.08	1.1	.94	.16	.9	1.7
2958	" 17	" 18	d	1	1 *.07	392.	363.2	28.8	40.	38.	58.	9.	8.	1.	1.	.52	.44	.08	.94	.78	.16	.26	2.3
2981	" 24	" 25	d	1	.13*.1	398.	384.8	13.2	43.6	40.	56.	8.7	8.	.7	2.4	.44	.4	.04	1.06	.86	.2	.2	1.8
3008	" 30	Dec. 1	d	1	.1	360.8	359.2	1.6	32.8	34.4	47.	7.7	6.2	1.5	2.8	.48	.36	.12	.85	.77	.08	.09	2.1
3040	Dec. 7	" 9	d	1	.15*.08	386.8	368.8	18.	42.	36.8	47.	8.	7.5	.5	3.28	.6	.52	.08	1.09	.85	.24	.1	.4
3068	" 14	" 16	d	1	.06	368.8	365.6	3.2	32.	22.8	49.	8.2	7.7	.5	3.28	.68	.48	.2	1.17	.93	.24	.13	2.
3084	" 21	" 23	d	1	.15*.1	382.	373.2	8.8	28.	26.	46.	9.5	9.	.5	3.52	.64	.52	.12	1.25	.97	.28	.03	1.2
3100	" 28	" 39	d	1	.2 *.1	405.6	398.8	6.8	20.8	20.	46.	14.	9.	5.	5.6	.8	.56	.24	1.25	.85	.4	.1	1.2
Average Jan.6–June 29						317.6	283.4	34.2	34.1	26.7	9.5	7.6	8.5	7.2	.376	.39	.36	.2	.84	.88	.52	.103	2.2
Average July–Dec.28						381.4	340.6	40.7	28.7	23.1	40.2	11.5	9.7	1.8	1.376	.54	.41	.13	1.14	.76	.37	.308	1.
Average Jan.6–Dec.28						351.4	312.	39.3	31.6	24.9	24.8	9.6	9.6	2.	.893	.46	.416	.118	.98	.71	.42	.203	1.6

*Not filtered. Odor none except on November 30 and December 7 when it was musty. Color on ignition brown.

CHEMICAL EXAMINATION OF WATER FROM THE ILLINOIS RIVER AT HAVANA.
(Parts per 1,000,000.)

Serial Number.	1898 Date of		Appearance.			Residue on Evaporation.					Chlorine.	Oxygen Consumed.			Nitrogen as Ammonia				Organic Nitrogen.			Nitrogen as	
									Loss on Ignition.							Albuminoid Ammonia.							
	Collec-tion.	Exami-nation.	Turbidity.	Sediment.	Color.	Total.	Dissolved.	Suspended.	Total.	Dis-solved.		Total.	By Dis-solved.	By Suspended Matt'r	Free Ammonia.	Total.	Dis-solved.	Sus-pended	Total.	Dissolved.	Suspended	Nitrites.	Nitrates.
3126	Jan. 4	Jan 5	d	l	.1*.2	391.2	383.6	7.6	26.4	25.2	42.	8.7	8.	.7	4.	.64	.48	.16	1.41	1.25	.16	.165	1.
3163	" 11	" 12	d	c	.15	400.8	395.6	5.2	18.	17.2	43.	9.1	8.4	.7	4.4	.64	.44	.2	1.64	.96	.68	.21	1.
3177	" 18	" 19	d	c	.15	407.2	376.	31.2	20.	20.	38.	11.8	7.8	4.	4.6	.6	.52	.08	1.24	.84	.4	.13	.8
3212	" 25	" 26	d	m	.15	424.4	292.4	132.	39.2	23.2	24.	15.	8.8	6.2	2.72	.64	.36	.28	1.32	.84	.48	.175	1.4
3228	Feb. 1	Feb. 2	d	c	.3	303.6	280.8	22.8	29.6	29.2	16.	9.5	8.1	1.4	1.68	.48	.4	.08	.92	.64	.28	.11	2.4
3252	" 8	" 9	d	l	.3	334	306.4	27.6	56.	37.2	15.	10.5	8.5	2.	1.44	.55	.32	.23	.92	.68	.24	.125	1.77
3268	" 15	" 16	d	c	.3	454.8	298.4	156.	36.8	26.4	15.	15.1	7.7	7.4	1.6	.6	.32	.28	1.24	.6	.64	.06	1.2
3295	" 22	" 23	d	c	.4	394.4	233.6	160.8	33.2	30.4	9.	15.	7.4	7.6	.73	.68	.28	.4	1.32	.64	.68	.03	3.2
33?6	Mar. 1	Mar. 2	d	l	.5	258.	248.	10.	35.2	28.8	10.	10.5	8.	2.5	.68	.44	.36	.03	.84	.68	.16	.045	2.5
3337	" 8	" 9	d	l	.4	281.2	278.	3.2	28.	20.	7.	10.7	8.8	1.9	.6	.44	.36	.08	.92	.76	.16	.02	1.6
3361	" 15	" 16	d	c	......	299.2	256.8	42.4	34.	21.6	8.	10.5	7.5	3.	.72	.44	.32	.12	1.	.64	.36	.055	1.25
3385	" 22	" 23	d	l	.3	260.	238.4	21.6	34.	30.	7.	7.9	7.5	.4	.36	.4	.36	.04	.92	.68	.24	.055	1.25
3404	" 29	" 30	d	c	.7	236.	226.4	9.6	27.6	24.	4.	9.5	8.2	1.3	.152	.4	.32	.08	.93	.61	.32	.08	1.2
3?28	April 5	April 6	d	l	.5	2?8.8	212.8	26.	33.2	24.8	6.	9.5	8.6	.9	.088	.4	.36	.04	.85	.73	.12	.055	1.
3453	" 12	" 13	d	c	......	237.6	194.4	43.2	27.6	23.	4.	12.3	9.2	3.1	.088	.44	.4	.04	1.09	.93	.16	.035	.85
3478	" 19	" 21	d	l	.25	250.8	244.8	6.	44.	40.8	6.	11.8	9.2	2.6	.16	.44	.36	.08	8	.73	.12	.05	.75
3506	" 26	" 27	d	l	.15	335.2	256.8	78.4	27.6	24.8	9.	12.	9.1	2.9	.088	.52	.32	.2	1.01	.77	.24	.035	1.1
3532	May 3	May 4	d	l	.1*.25	316.	287.2	28.8	50.8	40.8	11.	9.1	7.3	1.8	.34	.48	.4	.08	.98	.74	.24	.065	.85
3557	" 10	" 11	d	l	.05	319.2	299.6	19.6	49.2	37.2	11.	11.3	8.1	3.2	.08	.6	.44	.16	1.38	.74	.64	.07	1.
3591	" 17	" 18	d	c	.05	338.8	316.4	22.4	64.	62.5	12.	9.3	8.	1.3	.36	.36	.28	.08	.9	.78	.12	.06	.75
3620	" 24	" 25	d	l	.05*.25	261.2	256.8	4.4	30.8	26.8	10.	9.	7.5	1.5	.128	.4	.32	.08	.74	.58	.16	.075	.8
3638	" 31	June 1	d	c	.1*.4	261.2	255.2	6.	31.6	26.8	7.	8.5	8.	.5	.184	.32	.28	.04	.74	.62	.12	.2	.85
3664	June 7	" 8	d	l	.1*.2	296.	285.6	10.4	39.6	36.8	7.	8.5	7.5	1.	.24	.28	.2	.08	.64	.52	.12	.22	.525
3691	" 14	" 15	s	l	.05*.2	318.8	279.6	39.2	30.2	25.6	9.	7.7	7.5	.2	.16	.28	.24	.04	.68	.64	.04	.14	.45
3709	" 21	" 22	s	l	.1	329.6	318.4	11.2	46.8	18.	14.	8.6	7.7	.9	.32	.36	.32	.04	.84	.72	.12	.2?	.45
3754	" 28	" 29	s	l	.03	308.8	.....	.....	18.	.....	11.	7.9	7.	.9	.094	.24	.2	.04	.72	.64	.08	.22	.5
3785	July 5	July 6	d	c	.06	342.5	326.4	16.1	28.	24.	16.	8.5	6.8	1.7	.48	.36	.24	.12	.92	.48	.44	.22	.35

CHEMICAL EXAMINATION OF WATER FROM THE ILLINOIS RIVER AT HAVANA.—CONTINUED.

(Parts per 1,000,000.)

Serial Number.	1898 Date of Collection.	1898 Date of Examination.	Appearance. Turbidity.	Appearance. Sediment.	Appearance. Color.	Residue on Evaporation. Total.	Residue on Evaporation. Dissolved.	Residue on Evaporation. Suspended.	Loss on Ignition. Total.	Loss on Ignition. Dissolved.	Chlorine.	Oxygen Consumed. Total.	Oxygen Consumed. By Dissolved.	Oxygen Consumed. By Suspended Matt'r	Nitrogen as Ammonia. Free Ammonia.	Albuminoid Ammonia. Total.	Albuminoid Ammonia. Dissolved.	Albuminoid Ammonia. Suspended	Organic Nitrogen. Total.	Organic Nitrogen. Dissolved.	Organic Nitrogen. Suspended	Nitrogen as Nitrites.	Nitrogen as Nitrates.
3820	July 12	July 13	d	l	.04*.12	304.4	294.	10.4	16.8	14.	17.	8.5	8.	.5	.28	.44	.36	.08	.88	.76	.12	.13	.4
3843	" 19	" 20	d	l	.03*.04	319.6	297.6	22.	18.	16.	15.	8.4	8.	.4	.32	.4	.32	.08	.8	.68	.12	.13	.3
3884	" 26	" 27	d	l	.03*.05	310.8	309.2	1.6	22.	?1.2	16.	9.	8.5	.5	.6	.44	.36	.08	1.04	.8	.24	.04	.2
3905	Aug. 2	Aug. 3	d	c	.03	330.8	308.8	22.	16.	15.2	22.	8.9	7.8	1.1	1.	.48	.366	.114	.88	.68	.3	.04	.3
3937	" 9	" 10	d	l	.15*.2	370.8	354.8	16.	44.	33.6	29.	9.3	8.4	.9	.52	.6	.44	.16	1.28	.92	.36	.2	.15
3962	" 16	" 17	d	c	.04	374.	354.8	20.	29.2	26.8	37.	8.5	8.	.5	.36	.4	.36	.04	.96	.8	.16	.17	.15
308?	" 23	" 24	d	l	.04*.1	360.8	343.2	17.6	22.	20.	46.	8.1	6.1	2.	.608	.416	.352	.064	.88	.72	.16	.42	.15
401?	" 30	" 31	d	l	.04	337.8	316.4	20.8	24.8	20.	40.	8.5	7.5	1.	.76	.52	.36	.16	1.04	.72	.32	.22	.05
404?	Sept. 6	Sept. 7	d	l	.06	33?.2	299.6	33.6	28.	24.8	32.	9.5	6.5	3.	1.	.48	.32	.16	1.	.68	.32	.05	.05
407?	" 13	" 14	d	c	.03	356.	331.6	24.4	36.	34.	38.	7.5	7.	.5	.84	.32	.28	.04	.88	.68	.2	.25	.25
4092	" 20	" 21	d	c	.04	372.	328.	44.	48.	28.	36.	7.1	6.6	.5	.88	.36	.24	.12	.76	.6	.16	.28	.3
4125	" 27	" 28	d	l	.05	304.8	280.8	24.	39.2	26.8	35.	6.8	5.8	1.	1.16	.32	.28	.04	.68	.52	.16	.29	.45
416?	Oct. 4	Oct. 5	d	c	.04	322.	304.	18.	30.8	24.	25.	6.7	5.8	.9	.8	.32	.24	.08	.72	.52	.2	.14	.5
4198	" 11	" 12	d	l	.05*.15	336.4	318.8	17.6	35.2	34.	25.	6.2	5.5	.7	.8	.36	.28	.08	.53	.45	.08	.24	.4
4230	" 18	" 19	d	l	.05*.15	344	332.3	11.2	32.	28.	29.	7.	5.8	1.2	.76	.288	.24	.048	.73	.57	.16	.32	.65
4257	" 25	" 26	d	l	.06*.1	590.4	360.8	29.6	43.6	36.	38.	8.	6.6	1.4	1.84	.408	.?88	.12	.85	.65	.2	.105	.8
429?	Nov. 1	Nov. 2	d	c	.04	360.	339.2	20.8	32.	31.2	28.	7.	5.5	1.5	1.76	.36	.28	.08	.69	.45	.24	.04	.45
4334	" 8	" 9	d	c	.07	370.8	336.8	34.	32.	30.	19.	7.4	5.4	2.	.96	.32	.236	.084	.67	.51	.16	.04	.75
4402	" 22	" 23	d	c	.04	400.8	310	90.8	46.	36.	13.	9.	7.	2.	.6	.4	.208	.192	.79	.47	.32	.035	.9
443?	" 29	" 30	d	c	.05	360.	342.	18.	37.2	36.	12.	8.	6.2	1.8	.48	.304	.24	.08	.63	.51	.12	.035	1.25
4463	Dec. 6	Dec. 7	d	c	.07	379.2	370.	9.2	47.2	40.	16.	7.8	6.8	1.	.92	.336	.224	.112	.69	.57	.12	.04	.35
4485	" 13	" 14	d	c	....	392.8	391.2	1.6	66.	59.2	17.	8.3	8.	.3	1.08	.384	.272	.112	.8	.67	.13	.02	.1
4512	" 20	" 21	d	c	.04*.08	385.6	384.	1.6	56.5	56.	20.	9.1	8.4	.7	1.?4	.464	.272	.192	.89	.69	.2	.02	.35
4540	" 27	" 28	d	l	.07*.04	364.	390	4.	51.2	50.	27.	12.5	9.5	3.	2.4	.48	.4	.08	.89	.77	.12	.06	.2
Average Jan. 4th–June 21st..........						317.5	270.	47.4	35.	27.7	13.	10.3	8.	2.3	1.	.46	.34	.12	1.	.729	.27	.103	1.17
Average July 5th–Dec. 27th.........						362.1	332.9	29.1	35.1	30.5	25.	8.2	7.	1.2	.897	.398	.309	.088	.83	.634	.19	.139	.39
Average Jan. 4th–Dec. 27th.........						339.4	300.9	38.4	35.1	29.1	19.	9.3	7.5	1.7	.950	.431	.327	.103	.92	.683	.23	.121	.81

Odor, none. Color on ignition brown. *not filtered.

CHEMICAL EXAMINATION OF WATER FROM THE ILLINOIS RIVER AT HAVANA.
(Parts per 1,000,000.)

Serial Number.	1899 Date of Collection.	1899 Date of Examination.	Appearance. Turbidity.	Appearance. Sediment.	Appearance. Color.	Residue on Evaporation. Total.	Residue on Evaporation. Dissolved.	Residue on Evaporation. Suspended.	Residue on Evaporation. Loss on Ignition. Total.	Residue on Evaporation. Loss on Ignition. Dissolved.	Chlorine.	Oxygen Consumed. Total.	Oxygen Consumed. By Dissolved.	Oxygen Consumed. By Suspended Matt'r	Nitrogen as Ammonia. Free Ammonia.	Nitrogen as Ammonia. Albuminoid Ammonia. Total.	Nitrogen as Ammonia. Albuminoid Ammonia. Dissolved.	Nitrogen as Ammonia. Albuminoid Ammonia. Suspended	Organic Nitrogen. Total.	Organic Nitrogen. Dissolved.	Organic Nitrogen. Suspended	Nitrogen as Nitrites.	Nitrogen as Nitrates.
4570	Jan. 3	Jan. 4	d	c	.4	334.8	3?6.8	18.	54.	42.	19.	14.2	12.2	2.	1.72	.52	.384	.136	1.17	.85	.32	.025	.1
4597	" 10	" 11	d	c	.3	328.8	314.8	14.	32.8	30.	16.	12.	8.8	3.2	1.4	.44	.36	.08	.93	.69	.24	.02	.3
4618	" 17	" 18	d	c	.2	317.2	254.8	62.4	50.	48.	11.	14.	8.7	5.3	.72	.52	.304	.216	.97	.61	.36	.035	.85
4643	" 24	" 25	d	c	.25	296.	262.8	33.2	52.	48.	11.	12.	8.1	3.9	1.04	.48	.288	.192	.85	.57	.28	.035	.65
4665	" 31	Feb. 1	d	c	.15	287.2	270.8	16.4	48.	46.	12.	9.4	8.	1.4	.96	.44	.24	.2	.85	.61	.24	.021	.9
4684	Feb. 7	" 8	d	l	.1*.45	326.	318.8	7.2	48.	42.	15.	9.	8.	1.	1.?2	.4	.288	.112	.86	.58	.28	.024	1.5
4703	" 14	" 15	d		.1*.25	372.	364.	8.	58.	56.	20.	12.2	9.	3.2	1.48	.528	.368	.16	1.02	.74	.28	.03	1.75
4730	" 21	" 22	d		.15*.3	360.	354.	6.	56.	51.2	20.	9.8	9.1	.7	1.76	.512	.416	.096	1.22	.86	.36	.075	1.15
4757	" 28	Mar. 1	d	vm	.6	750.	178.	572.	82.	40.	10.	37.	9.9	27.1	1.12	1.36	.4	.96	2.34	.58	1.76	.042	.75
4781	Mar. 7	" 8	vd	vm	.7	442.	194.	248.	66.	40.	10.	27.3	15.	12.3	.76	.84	.384	.456	1.94	.74	1.2	.04	.95
48?3	" 14	" 15	vd	m	.5	370.	152.4	217.6	58.	33.2	5.8	23.8	13.5	10.3	.6	.72	.32	.4	1.78	.66	1.12	.023	.8
4840	" 21	" 22	d	m	.7	3?4.	178.8	185.2	52.	42.	5.2	19.8	12.8	7.	.56	.56	.304	.256	1.35	.6	.75	.035	1.25
4846	" 28	" 29	d	c	.5	268.8	242.	26.8	50.	46.	5.8	15.8	11.6	4.2	.56	.48	.32	.16	1.07	.63	.44	.04	1.35
4890	Apr. 4	Apr. 5	d		.4	266.	206.	60.	46.	40.	6.6	13.5	9.3	4.2	.56	.44	.32	.12	.99	.6	.39	.015	1.6
4919	" 12	" 13	d	l	.1	236.	208.8	27.2	36.	34.	7.	12.	9.	3.	.603	.352	.288	.064	.83	.63	.2	.045	1.7
49?0	" 28	" 19	d	c	.2	279.6	260.	19.6	52.	50.	7.4	11.	8.7	2.3	.4	.4	.32	.08	.75	.6	.15	.05	1.7
4964	" 25	" 26	d	c	.1	298.8	276.8	22.	50.8	48.8	9.2	12.5	9.	3.5	.24	.64	.352	.288	1.33	.89	.44	.055	1.25
4990	May 2	May 3	d	c	......	324.4	293.2	31.2	50.8	50.	11.	13.	9.	4.	.144	.48	.248	.232	1.29	.85	.44	.065	.5
5011	" 9	" 10	d	c	.04	341.2	305.6	35.6	33.6	32.	1?.	11.2	10.1	1.1	.56	.44	.384	.056	1.21	.97	.24	.1	1.6
504?	" 16	" 17	d	l	.04*.05	359.2	316.8	42.4	23.6	4.	18.	12.8	12.2	.6	1.024	.48	.352	.128	1.13	.89	.24	.12	1.12
5078	" 23	" 24	d	c	.04	4?6.	344.4	81.6	47.2	43.2	18.2	15.4	12.8	2.6	.96	.56	.684	.176	1.45	1.114	.336	.075	1.08
5114	" 30	" 31		c	.?	347.6	328.	19.6	28.	26.4	13.2	11.7	10.3	1.4	.72	.448	.384	.064	1.05	.86	.19	.12	1.56
5208	June 13	June 14		c	.1	361.6	317.6	44.	37.6	36.8	15.	12.3	10.5	1.8	.72	.416	.352	.064	1.4	.824	.576	.24	1.2
5246	" 20	" 21	d	c	.15	356.8	343.6	13.2	50.	48.8	14.5	14.3	11.	3.3	.396	.512	.32	.192	1.16	.856	.304	.16	1.12
5303	" 28	" 29	d	c	.1	371.2	324.4	46.8	29.2	26.4	19.	13.1	12.	1.1	.688	.512	.464	.048	1.32	1.016	.304	.14	.76
5352	July 5	July 6	d	c	.03	391.2	318.8	72.4	44.	39.2	21.5	14.1	6.5	7.6	.8	.48	.352	.128	1.48	1.112	.368	.18	.4
5401	" 12	" 13	d	c	.1	389.6	356.8	32.8	72.	68.8	28.	14.5	11.8	2.7	.88	.416	.352	.064	1.16	.888	.272	.23	1.12

CHEMICAL EXAMINATION OF WATER FROM THE ILLINOIS RIVER AT HAVANA.—CONTINUED.
(Parts per 1,000,000.)

Serial Number.	1899. Date of Collection.	Date of Examination.	Appearance. Turbidity.	Sediment.	Color.	Residue on Evaporation. Total.	Dissolved.	Suspended.	Loss on Ignition. Total.	Loss on Ignition. Dissolved.	Chlorine.	Oxygen Consumed. Total.	By Dissolved.	By Suspended Matt'r	Nitrogen as Ammonia. Free Ammonia.	Albuminoid Ammonia. Total.	Dissolved.	Suspended	Organic Nitrogen. Total.	Dissolved.	Suspended	Nitrogen as Nitrites.	Nitrates.
5447	July 19	July 20	d	c	.08	358.	340.4	17.6	44.4	40.	36.	12.6	11.7	.9	.784	.48	.288	.192	1.	.724	.276	.3	1.28
5494	" 26	" 27	d	c	.07	306.	292.8	13.2	47.6	47.2	30.	11.	10.2	.8	.96	.416	.272	.144	1.08	.76	.32	.24	.84
5540	Aug. 2	Aug. 3	d	c	.2	345.2	314.	31.2	74.	51.6	30.	12.7	11.7	1.	.64	.448	.384	.064	1.24	.792	.448	.18	.76
5601	" 9	" 10	d	c	.04	370.	320.8	49.2	49.6	42.4	31.	11.7	10.	1.7	.96	.384	.224	.16	.92	.728	.192	.17	.4
5640	" 16	" 17	d	c	.07	410.	341.2	68.8	80.	68.4	30.5	13.4	11.5	1.9	.976	.432	.304	.128	1.32	.728	.592	.23	.6
5695	" 23	" 24	d	c	.05	408.	347.2	60.8	46.4	45.2	35.	13.3	9.8	3.5	.509	.592	.32	.272	1.4	.728	.672	.23	.64
5759	" 30	" 31	d	c	.04	397.2	334.4	62.8	44.8	24.	40.	12.	10.8	1.2	.544	.64	.32	.32	1.4	.84	.56	.11	.36
5803	Sept. 6	Sept. 7	d	c	.06	395.6	340.	55.6	29.6	29.2	41.	13.1	8.6	4.5	.768	.64	.4	.24	1.72	.92	.8	.04	.6
5859	" 13	" 14	d	c	.1	423.2	352.8	70.4	49.2	46.4	44.2	12.9	7.5	5.4	.928	.64	.4	.24	1.56	1.	.56	.05	.32
5897	" 20	" 21	d	c	.04	387.6	294.8	92.8	44.4	44.	35.5	12.9	8.2	4.7	.608	.48	.272	.208	1.4	.824	.576	.08	.6
5962	" 27	" 28	d	m	.06	416.4	352.8	63.6	46.4	40.	50.	12.2	9.3	2.9	.752	.592	.368	.224	1.54	1.06	.48	.08	.64
6008	Oct. 4	Oct. 5	d	c	.08	406.8	351.6	55.2	45.2	21.2	54.	15.	10.3	4.7	.432	.768	.4	.358	1.86	.772	1.088	.24	1.16
6055	" 11	" 12	d	c	.15	443.6	389.6	54.	32.8	26.4	61.5	13.4	11.2	2.2	.64	.56.	.4	.16	1.32	.6	.72	.45	1.32
6104	" 18	" 19	d	c	.25	402.4	352.	50.4	21.6	19.2	60.5	14.3	7.1	7.2	1.6	.704	.432	.272	1.93	1.096	.864	.7	.56
9170	" 25	" 26	d	c	.05	417.6	375.6	42.	18.4	17.6	58.2	9.2	7.8	1.4	1.6	.672	.48	.192	1.224	1.	.224	.325	1.76
6211	Nov. 1	Nov. 2	d	c	.04	436.8	415.2	21.6	42.8	24.8	63.5	10.5	9.	1.5	1.472	.624	.368	.256	1.384	.584	.8	.9	2.6
6258	" 8	" 9	d	c	.04	414.4	404.	10.4	49.6	46.4	57.	9.3	8.1	1.2	2.56	.704	.416	.288	1.4	.808	.592	.875	2.8
6317	" 15	" 16	d	c	.04	397.6	374.	23.6	35.6	32.4	43.	8.2	7.9	.3	2.76	.736	.4	.336	1.16	.68	.48	.25	2.
6357	" 22	" 23	d	c	.04	383.2	363.6	19.6	27.6	22.	48.	8.2	7.	1.2	3.36	.48	.288	.192	1.48	.52	.96	.07	1.48
6421	" 29	" 30	d	c	.03	365.6	356.	9.6	41.2	39.6	53.	8.5	7.4	1.1	3.28	.56	.336	.224	1.224	.872	.352	.06	1.28
6469	Dec. 6	Dec. 8	d	c	.03	366.	358.4	7.6	38.4	35.2	34.	9.6	8.4	1.2	1.76	.672	.352	.32	1.88	.808	1.072	.08	1.52
6522	" 13	" 15	d	c	.03	362.8	357.2	5.6	41.6	39.2	35.5	10.8	9.4	1.4	2.55	.96	.432	.528	1.64	.904	.736	.08	2.4
6558	" 20	" 21	d	c	.03	373.2	371.2	2.	31.2	30.8	36.	13.4	9.8	3.6	2.24	.512	.432	.08	1.16	.84	.32	.08	1.76
Average Jan. 3—June 28						351.4	271.	80.9	47.6	40.1	12.5	14.5	10.3	4.3	.832	.539	.341	.197	1.171	.752	.457	.066	1.09
Average July 5—Dec. 20						390.7	351.	38.1	43.9	37.6	42.2	11.8	9.2	9.4	1.376	.583	.359	.234	1.396	.823	.572	.26	1.16
Average Jan. 3—Dec. 20						370.8	314.	60.7	45.8	38.9	27.3	13.3	9.7	3.4	1.104	.561	.35	.21	1.282	.788	.615	.163	1.12

Odor none. Color on ignition generally brown, but occasionally gray.

CHEMICAL EXAMINATION OF WATER FROM THE ILLINOIS RIVER AT HAVANA.
(Parts per 1,000,000.)

Serial Number.	1900. Date of		Appearance.			Residue on Evaporation.					Chlorine.	Oxygen Consumed.			Nitrogen as Ammonia				Organic Nitrogen.			Nitrogen as	
	Collection.	Examination.	Turbidity.	Sediment.	Color.	Total.	Dissolved.	Suspended.	Loss on Ignition. Total.	Loss on Ignition. Dissolved.		Total.	By Dissolved.	By Suspended Matt'r	Free Ammonia.	Albuminoid Ammonia. Total.	Albuminoid Ammonia. Dissolved.	Albuminoid Ammonia. Suspended	Total.	Dissolved.	Suspended	Nitrites.	Nitrates.
6679	Jan. 11	Jan. 12	d	c	.04	361.2	352.8	8.4	51.2	45.2	21.5	8.8	8.3	.5	1.6	.48	.304	.176	1.04	.736	.304	.04	2.4
6752	" 24	" 25	d	c	.04	368.	338.4	29.8	26.8	24.8	26.7	11.2	9.	2.2	2.56	.448	.352	.096	.88	.64	.24	.05	2.
6795	" 31	Feb. 1	d	c	.15	311.2	295.6	15.6	15.2	15.2	23.	9.1	8.8	.3	2.4	.512	.32	.192	1.04	.64	.4	.03	2.4
6861	Feb. 7	" 8	d	c	.06	312.8	266.8	46.	18.	17.2	18.	9.3	7.	2.3	1.76	.464	.24	.224	.96	.64	.32	.027	1.36
6907	" 14	" 15	d	c	.06	302.8	232.4	70.4	36.8	25.6	15.7	9.7	7.	2.7	1.216	.416	.304	.112	.96	.576	.384	.031	1.4
6946	" 21	" 22	d	c	.15	262.8	224.4	38.4	55.6	20.	12.2	10.8	7.6	3.2	.896	.544	.32	.224	.88	.64	.24	.03	1.28
6996	Mar. 1	Mar. 3	d	c	.06	290.8	230.	60.8	20.8	20.4	11.	13.	10.9	2.1	.864	.448	.304	.144	.88	.64	.24	.04	1.48
7042	" 7	" 8	d	m	.5	266.4	234.4	32.	37.2	28.4	11.	11.7	10.9	.8	.88	.416	.288	.128	.96	.64	.32	.035	1.8
7081	" 14	" 15	vd	v"	.4	1067.6	85.6	982.	44.4	11.6	4.	28.2	13.1	15.1	.4	1.44	.24	1.2	3.04	.576	2.464	.01	.4
7149	" 22	" 23	d	c	.4	255.2	138.8	116.4	19.2	10.8	5.5	12.1	6.9	5.2	.528	.416	.224	.192	1.24	.6	.64	.008	1.08
7200	" 29	" 30	d	c	.2	201.2	147.6	53.6	16.4	14.4	4.	8.6	6.1	2.5	.32	.224	.176	.048	.632	.472	.16	.017	1.38
7229	April 4	April 5	d	c	.3	193.6	166.4	27.2	19.6	17.6	5.6	11.2	7.7	3.5	.448	.272	.208	.064	.536	.456	.08	.018	1.68
7292	" 11	" 12	d	c	.3	227.	202.	25.	22.	22.	5.	9.1	7.3	1.8	.256	.224	.192	.032	.6	.536	.064	.03	2.2
7346	" 18	" 19	d	c	.15	229.2	189.6	39.6	34.	32.8	5.3	8.1	6.9	1.2	.24	.224	.176	.048	.504	.44	.064	.035	2.2
7406	" 25	" 26	d	c	...	220.4	202.8	17.6	30.	24.	6.9	9.8	8.1	1.7	.048	.4	.256	.144	1.24	.664	.576	.036	1.68
7446	May 2	May 3	d	c	.1	234.4	216.4	18.	35.6	33.6	9.	10.3	8.4	1.9	.08	.56	.272	.288	1.16	.74	.42	.052	.88
7490	" 9	" 10	d	c	.03	302.8	250.8	52.	22.8	20.	9.8	10.8	8.2	2.6	.16	.448	.288	.16	.9	.612	.288	.06	.8
7548	" 16	" 17	..	..	.1	327.2	264.	63.2	36.	34.8	13.2	12.4	8.5	3.9	.384	.416	.32	.096	1.284	.132	1.152	.075	.76
7591	" 23	" 24	d	l	.05	382.8	294.	88.8	57.6	35.6	13.5	12.2	7.7	4.5	.448	.352	.24	.112	.9	.74	.16	.115	.12
7626	" 30	" 31	d	c	.1	328.4	267.6	60.8	24.8	19.6	16.	11.1	8.5	2.6	.432	.368	.272	.096	1.16	.644	.516	.075	1.2
7711	June 13	June 14	d	c	.03	342.	265.2	76.8	66.8	36.8	14.	9.7	6.4	3.3	.272	.32	.272	.048	1.22	.772	.448	.21	1.84
7847	July 5	July 6	d	m	...	285.6	252.4	33.2	29.2	24.4	18.	7.	6.8	.2	.408	.224	.208	.016	.612	.388	.224	.16	1.52
7909	" 11	" 12	d	l	.02	276.4	248.	28.4	32.	30.8	12.	6.5	6.2	.3	.288	.176	.16	.016	.516	.324	.192	.095	1.12
7958	" 18	" 19	d	l	.02	301.6	244.4	57.2	31.6	27.6	22.	7.5	5.9	1.6	.448	.24	.144	.096	.804	.58	.224	.12	1.24

Chemical Examination of Water from the Illinois River at Havana.—Continued.
(Parts per 1,000,000.)

Serial Number.	1900 Date of		Appearance.			Residue on Evaporation.			Loss on Ignition.		Chlorine.	Oxygen Consumed.			Nitrogen as Ammonia				Organic Nitrogen.			Nitrogen as	
	Collection.	Examination.	Turbidity.	Sediment.	Color.	Total.	Dissolved.	Suspended.	Total.	Dissolved.		Total.	By Dissolved.	By Suspended Matt'r	Free Ammonia.	Albuminoid Ammonia. Total.	Dissolved.	Suspended	Total.	Dissolved.	Suspended	Nitrites.	Nitrates.
8021	July 25	July 26	d	l	.01	310	233.2	76.8	27.6	27.6	25.	6.5	6.2	.3	.33	.272	.24	.032	.836	.356	.48	.08	1.4
8081	Aug. 1	Aug. 2	d	l	.01	273.2	232.	41.2	25.6	23.6	24.	6.5	5.1	1.4	.24	.248	.204	.044	.546	.356	.19	.13	1.28
8142	" 9	" 10	d	l	.01	269.2	219.2	50.	43.2	42.8	17.	7.2	4.3	2.9	.144	.304	.224	.08	.836	.456	.38	.08	.68
8203	" 16	" 18	d	l	.02	316.2	200.4	115.8	24.8	22.	18.	7.8	4.4	3.4	.416	.304	.192	.212	.836	.38	.456	.1	.76
8258	" 22	" 23	d	l	.02	221.2	203.6	17.6	15.2	13.2	20.	6.6	4.7	1.9	.352	.288	.16	.128	.508	.316	.192	.15	1.04
8313	" 29	" 30	d	l	.01	273.6	228.	45.6	30.	19.2	21.	6.5	4.4	2.1	.448	.368	.176	.192	.668	.3	.338	.16	1.08
8392	Sept. 6	Sept. 7	d	l	.01	290.4	249.6	40.8	21.2	19.2	20.	6.6	4.4	2.2	.176	.32	.192	.128	.536	.384	.152	.13	1.08
8451	" 12	" 13	d	l	.03	252.	234.4	17.6	26.8	24.	16.	6.6	4.5	2.1	.512	.4	.16	.24	.76	.4	.36	.11	1.
8510	" 20	" 21	d	c	.1	294.4	253.2	41.4	29.6	25.6	21.	8.1	5.6	2.5	.392	.4	.192	.208	.76	.384	.376	.19	1.
8543	" 26	" 27	d	c	.2	322.	266.8	55.2	31.2	24.	23.	7.6	5.8	1.8	.584	.352	.176	.176	1.084	....	....	.12	1.08
8613	Oct. 4	Oct. 4	d	c	.02	308.4	254.4	54.	30.	27.6	18.	6.2	4.9	1.3	.528	.304	.272	.032	.88	.592	.088	.12	1.2
8663	" 15	" 16	d	l	.04	268.	231.2	36.8	18.4	17.6	16.	6.5	4.8	1.7	.352	....	.128	....	.....	.624	....	.12	1.32
8696	" 24	" 25	d	l	.01	270.4	239.2	31.2	26.4	20.4	13.	5.9	5.4	.5	.464	.256	.224	.032	.72	.672	.048	.02	1.5
8728	" 30	" 31	d	l	....	270.4	231.2	39.2	26.8	24.4	15.	5.6	5.	.6	.528	.192	.16	.032	.624	.592	.032	.05	1.15
8752	Nov. 6	Nov. 7	d	l	.02	257.2	234.	23.2	16.8	....	17.	5.3	4.9	.4	.56	.224	.208	.016	.704	.512	.192	.065	1.375
8777	" 13	" 14	d	l	.01	307.6	237.2	70.4	20.4	19.6	16.	7.2	5.4	1.8	.368	.4	.208	.192	.88	.672	.208	.045	1.795
8801	" 20	" 21	d	v l	.03*.05	254.	236.4	17.6	26.8	24.	14.	5.1	...	...	.664	.304	.288	.016	.752	.672	.08	.026	1.134
8823	" 26	" 27	d	l	.05	256.4	229.6	26.8	20.4	18.8	17.	6.4	5.9	.5	.896	.368	.16	.208	.848	.64	.208	.035	1.205
8874	Dec. 5	Dec. 6	d	l	.1	267.2	260.8	6.4	19.6	16.	9.	5.5	5.4	.1	.336	.24	.224	.016	.512	.48	.032	.026	1.254
8880	" 10	" 11	d	l	.15	262.8	258.4	4.4	27.6	18.	12.	7.2	6.8	.4	.24	.304	.144	.16	.64	.448	.192	.03	1.33
8904	" 18	" 19	d	l	.2	268.	264.	4.	27.2	26.	12.	7.2	7.1	.1	.336	.336	.272	.064	.88	.72	.16	.022	1.298
8921	" 24	" 26	d	l	.15	273.6	266.4	7.2	29.2	27.6	12.	8.1	8.	.1	.656	.432	.336	0.96	.848	.752	.096	.021	1.019
Average Jan. 11th –June 13th.......						323.2	331.6	91.5	32.8	24.3	12.	11.3	3.4	7.8	.771	.447	.265	.182	1.	.596	.403	.049	1.444
Average July 5th –Dec.24th						277.9	240.3	37.6	26.3	23.7	17.1	6.6	5.4	1.1	.428	.302	.216	.086	.704	.5	.204	.088	1.194
Average Jan. 11th–Dec. 24th.......						298.6	236.3	62.2	29.3	24.	14.8	6.6	4.5	2.0	.585	.361	.23	.131	.839	.533	.306	.024	1.308

Odor on July 5 clayey; August 16 gassy; November 13 and November 18 and 24 musty; at all other dates odorless. Color on ignition brown.
*Not filtered.

CHEMICAL EXAMINATION OF WATER FROM THE ILLINOIS RIVER AT KAMPSVILLE.
(Parts per 1,000,000.)

Serial Number.	1897 Date of		Appearance.			Residue on Evaporation.					Chlorine.	Oxygen Consumed.			Nitrogen as Ammonia				Organic Nitrogen.			Nitrogen as	
	Collection.	Examination.	Turbidity.	Sediment.	Color.	Total.	Dissolved.	Suspended.	Loss on Ignition. Total.	Loss on Ignition. Dissolved.		Total.	By Dissolved.	By Suspended Matt'r	Free Ammonia.	Albuminoid Ammonia. Total.	Albuminoid Ammonia. Dissolved.	Albuminoid Ammonia. Suspended	Total.	Dissolved.	Suspended	Nitrites.	Nitrates.
1819	Jan. 12	Jan. 13	d	c	.2	655.6	254.	401.6	23.2	11.6	8.	15.3	7.4	7.9	.304	.64	.36	.28	1.28	.56	.72	.45	2.3
1839	" 19	" 20	vd	m	.3	768.4	216.	552.4	32.8	14.	7.	15.9	8.2	7.7	.256	.64	.208	.432	1.44	.72	.72	.03	2.4
1853	" 26	" 30	d	c	.1	606.4	284.4	322.	18.8	18.	6.8	14.3	7.8	6.5	.244	.8	.48	.32	1.44	.88	.56	.05	3.1
1875	Feb. 2	Feb. 3	d	l	.07	322.8	291.6	31.2	10.8	10.	6.4	8.3	7.7	6.	.368	.32	.24	.08	1.12	.8	.32	.017	3.2
1902	" 9	" 11	d	c	.2	342.4	272.	70.4	20.8	19.6	6.1	9.4	6.8	2.6	.288	.4	.176	.224	.88	.72	.16	.04	2.4
1919	" 16	" 17	d	c	.2	379.2	284.8	94.4	24.8	14.	8.	11.3	7.4	3.9	.48	.56	.24	.32	1.12	.8	.32	.035	2.4
1933	" 23	" 24	d	c	.3	421.6	254.	167.6	37.2	31.2	7.	11.8	7.	4.8	.544	.64	.32	.32	1.14	.72	.42	.09	2.
1962	Mar. 2	Mar. 3	d	l	.15	331.6	275.2	56.	40.	38.	8.	10.1	6.6	3.5	.464	.4	.24	.16	1.35	.67	.68	.075	2.3
1984	" 9	" 10	d	m	.2	557.6	219.6	338.	48.4	32.	5.	16.5	7.8	8.7	.228	.8	.176	.624	1.23	.67	.56	.04	2.
2021	" 16	" 18	d	c	.15	463.2	229.2	234.	74.	50.	4.6	14.4	7.6	6.8	.24	.56	.192	.368	1.4	.51	.89	.06	2.2
2043	" 23	" 25	vd	m	.15	518.	213.2	304.8	48.8	35.2	5.8	17.3	7.4	9.9	.196	.52	.22	.3	1.15	.51	.64	.05	2.3
2062	" 30	" 31	d	c	.2	326.8	210.	116.8	40.	27.2	4.4	11.7	7.1	4.6	.164	.32	.24	.08	1.07	.75	.32	.06	2.6
2096	April 6	April 7	vd	c	.1	422.	228.4	193.6	26.8	26.8	3.4	16.	7.5	8.5	.068	.56	.24	.32	1.07	.6	.47	.07	2.4
2119	" 13	" 14	d	c	.2	294.4	219.2	75.2	32.4	32.	4.	11.	6.5	4.5	.096	.48	.208	.272	.6	.51	.09	.065	2.4
2141	" 21	" 22	d	l	.2*.3	293.6	266.	27.6	42.8	40.	4.6	11.3	7.4	3.9	.028	.32	.192	.128	.83	.67	.16	.035	2.4
2160	" 27	" 29	d	c	.06	294.8	240.8	54.	35.6	34.	4.8	11.	6.5	4.5	.056	.56	.192	.368	1.19	.8	.39	.03	1.7
2188	May 4	May 5	d	c	.04	274.	262.8	11.2	30.	26.	7.	11.	8.	3.	.084	.56	.304	.256	1.19	.63	.56	.036	1.5
2212	" 11	" 13	d	l	.03	333.2	266.	67.2	21.6	20.8	6.6	10.3	8.1	2.2	.076	.56	.208	.352	1.03	.63	.4	.065	1.6
2236	" 19	" 21	d	c	.03	403.6	298.	105.6	34.	16.	7.6	12.7	7.7	5.	.104	.48	.24	.24	1.23	.75	.48	.084	1.4
2257	" 25	" 26	d	c	.2	406.	300.8	105.2	23.6	20.	8.4	10.7	8.	2.7	.164	.48	.4	.08	1.23	.83	.4	.07	1.1
2284	June 1	June 2	vd	c	.04	425.2	298.8	126.4	28.	22.	10.	12.	9.4	2.6	.168	.64	.48	.16	1.55	.91	.64	.135	.5
2306	" 8	" 9	d	c	.05	402.4	318.8	83.6	28.	22.8	12.	12.1	7.7	4.4	.184	.64	.4	.24	1.21	.81	.4	.22	1.3
2330	" 15	" 16	d	c	.04	402.4	314.4	88.	41.2	32.	13.	11.	7.4	3.6	.084	.48	.264	.216	1.11	.73	.38	.2	1.2
2364	" 22	" 23	d	c	.06	382.8	300.8	82.	26.	24.	12.	10.	…	…	.064	.48	.4	.08	1.07	.73	.34	.225	1.3
2389	" 29	" 30	d	c	……	502.	314.4	187.6	54.	20.	18.	13.1	9.4	3.7	.024	.56	.256	.304	1.13	.67	.46	.23	1.6
2413	July 6	July 7	d	c	……	374.8	280.8	94.	34.	24.4	9.	12.2	8.8	3.4	.01	.44	.3	.14	1.24	.86	.38	.14	1.6
2471	" 20	" 21	d	c	.07	342.8	274.	68.8	28.	20.	12.	8.9	8.	.9	.12	.64	.416	.224	.92	.52	.4	.08	.7

*Not Filtered.

CHEMICAL EXAMINATION OF WATER FROM THE ILLINOIS RIVER AT KAMPSVILLE.—CONTINUED.
(Parts per 1,000,000.)

Serial Number.	1897 Date of Collection.	1897 Date of Examination.	Appearance. Turbidity.	Appearance. Sediment.	Appearance. Color.	Residue on Evaporation. Total.	Residue on Evaporation. Dissolved.	Residue on Evaporation. Suspended.	Loss on Ignition. Total.	Loss on Ignition. Dissolved.	Chlorine.	Oxygen Consumed. Total.	Oxygen Consumed. By Dissolved.	Oxygen Consumed. By Suspended Matt'r	Nitrogen as Ammonia. Free Ammonia.	Albuminoid Ammonia. Total.	Albuminoid Ammonia. Dissolved.	Albuminoid Ammonia. Suspended	Organic Nitrogen. Total.	Organic Nitrogen. Dissolved.	Organic Nitrogen. Suspended	Nitrogen as Nitrites.	Nitrogen as Nitrates.
2493	July 27	July 28	d	c	.4	396.	188.	208.	18.	12.	9.	10.5	9.1	1.4	.128	.56	.32	.24	1.16	.84	.32	.18	.4
2525	Aug. 3	Aug. 4	d	c	.08	314.	280.	34.	18.	16.	19.	10.5	9.1	1.4	.024	.56	.416	.144	1.	.76	.24	.2	1.5
2544	" 9	" 11	d	c	.2	315.6	251.2	64.4	16.	14.4	13.	9.7	8.5	1.2	.068	.48	.288	.192	1.72	1.08	.64	.2	1.1
2572	" 17	" 18	d	c	.1	296.8	270.4	26.4	15.6	14.4	16.	10.8	9.9	9.	.032	.56	.256	.304	1.08	.76	.32	.1	1.3
2596	" 24	" 25	d	l	.06	300.8	274.8	26.	15.2	14.	15.	9.5	9.	.5	.056	.64	.224	.416	.9	.66	.24	.06	1.
2623	Sept. 1	Sept. 2	d	c	.15	308.	286.	22.	24.	21.5	15.	9.7	9.2	.5	.148	.44	.28	.16	.82	.54	.28	.06	.3
2646	" 7	" 8	d	c	.1	315.6	.....	.....	19.2	....	20.	12.5	9.	3.5	.358	.56	.44	.12	1.46	.7	.76	.085	1.3
2677	" 14	" 16	d	l	.05	328.	299.6	28.4	18.	15.2	23.	11.9	9.	2.9	.526	.52	.36	.16	1.06	.82	.24	.045	.2
2698	" 21	" 22	d	l	.05	334.	316.	18.	12.8	11.2	28.	9.2	8.5	.7	.4	.36	.336	.024	.9	.62	.28	.1	.3
2732	" 29	" 30	d	c	.06	345.2	310.8	34.4	31.2	14.	34.	11.8	9.7	2.1	.342	.68	.4	.28	1.34	.98	.36	.085	.5
2788	Oct. 12	Oct. 13	d	l	.1	376.4	317.2	59.2	31.6	20.	41.	9.2	8.6	.6	.32	.4	.32	.08	.....	.78	...	.07	.2
2828	" 19	" 20	d	l	.15	352.	331.6	20.4	18.	16.	42.	10.2	9.6	.6	.328	.44	.4	.04	.94	.78	.16	.075	.4
2845	" 26	" 27	d	l	.2*.4	357.2	339.6	17.6	28.4	23.6	45.	8.2	7.3	.9	.36	.4	.36	.04	.78	.7	.08	.085	.8
2883	Nov. 2	Nov. 3	d	l	....	377.5	344.8	32.7	34.	32.	47.	9.6	8.5	1.1	.36	.36	.3	.06	....	....	...	.02	1.
2920	" 9	" 10	d	l	.08	359.2	334.8	24.4	25.6	24.	47.	10.2	7.7	2.5	.4	.4	.32	.08	.78	.62	.16	.035	1.5
2961	" 16	" 17	d	c	.05	386.	354.4	31.6	32.	30.	49.	7.	6.3	.7	.4	.36	.24	.12	.78	.62	.16	.09	1.4
2980	" 23	" 24	d	c	.1	385.2	382.	3.2	42.	38.8	50.	6.8	5.8	1.	.4	.44	.22	.12	.7	.5	.2	.09	1.2
3012	" 30	Dec. 1	d	c	.08	360.8	352.	8.8	44.8	22.	48.	7.6	6.5	1.1	.52	.4	.28	.12	.85	.65	.2	.07	2.2
3038	Dec. 7	" 8	d	l	.07*.1	374.8	366.4	8.4	48.8	28.	47.	7.8	6.6	1.2	1.6	.4	.28	.12	.85	.65	.2	.07	2.
3071	" 14	" 16	d	l	.07*.15	358.	333.6	24.4	39.6	31.6	43.	7.3	6.2	1.1	1.68	.44	.36	.08	.85	.53	.32	.08	1.9
3082	" 21	" 23	d	l	.05*.17	358.	352.4	5.6	20.	18.	43.	8.5	7.5	1.	1.76	.56	.36	.2	1.05	.65	.4	.08	2.
3099	" 28	" 29	d	l	.06*.08	365.2	363.2	2.	32.	31.2	42.	8.8	7.4	1.4	1.88	.48	.4	.08	1.01	.65	.36	.08	1.5
Average Jan. 12—June 29						421.1	265.3	155.8	49.7	25.4	7.5	11.5	7.2	4.2	.199	.53	.275	.26	1.16	.7	.35	.081	1.9
Average July 6—Dec. 28						336.4	330.5	35.8	26.9	20.5	31.5	9.5	8.1	1.3	.509	.48	.332	.147	.88	.67	.2	.091	1.1
Average Jan. 12—Dec. 28						379.6	282.5	97.	38.5	23.	19.3	10.9	7.7	3.2	.351	.5	.303	.205	1.24	.69	.55	.088	1.5

Odor none. Color upon ignition generally brown, occasionally gray.

*Not Filtered.

CHEMICAL EXAMINATION OF WATER FROM THE ILLINOIS RIVER AT KAMPSVILLE.
(Parts per 1,000,000.)

Serial Number.	1898 Date of Collection.	Examination	Appearance. Turbidity.	Sediment.	Color.	Residue on Evaporation. Total.	Dissolved.	Suspended.	Loss on Ignition. Total.	Dis-solved.	Chlorine.	Oxygen Consumed. Total.	By Dis-solved.	By Suspended Matt'r	Nitrogen as Ammonia Free Ammonia.	Albuminoid Ammonia. Total.	Dis-solved.	Sus-pended	Organic Nitrogen. Total.	Dissolved.	Suspended	Nitrogen as Nitrites.	Nitrates.
3124	Jan. 4	Jan. 5	d	c	.05*.2	368.8	360.	8.8	32.	20.	37.	7.9	6.7	1.2	2.04	.48	.36	.12	.85	.69	.16	.08	1.5
3159	" 11	" 12	vd	vm	.6	538.8	275.2	263.6	46.4	18.4	23.	19.1	7.4	11.7	1.88	.72	.36	.36	1.64	1.	.64	.2	.9
3173	" 18	" 19	d	vm	.8	719.2	258.	461.2	37.2	20.	15.	24.8	10.7	14.1	1.44	1.2	.48	.72	2.52	1.	1.52	.1	.7
3229	Feb. 1	Feb. 3	d	c	......	360.	279.2	80.8	22.8	18.	15.	12.8	8.1	4.7	1.5	.56	.36	.2	.92	.72	.2	.09	1.6
3257	" 8	" 10	d	c	.2	342.8	274.	68.8	36.	33.2	13.	11.	7.3	3.7	1.24	.48	.28	.2	1.	.64	.36	.09	2.5
3266	" 15	" 16	d	c	.6	737.2	204.8	532.4	42.8	22.8	8.	26.	8.4	17.6	.72	.92	.28	.64	1.88	.52	1.36	.05	.85
3298	" 22	" 23	vd	m	.5	697.2	228.4	468.8	30.8	27.2	8.	17.	7.3	9.7	.596	.84	.32	.52	1.4	.56	.84	.04	2.5
3317	Mar. 1	Mar. 2	d	c	.08	452.	232.8	219.2	24.	23.2	8.	14.4	7.2	7.2	.52	.56	.28	.28	1.08	.56	.52	.025	2.9
3335	" 8	" 9	d	c	.2	409.2	256.	153.2	36.	23.8	8.	11.8	6.8	5.	.48	.56	.32	.24	.84	.52	.32	.03	1.5
3363	" 15	" 16	d	m	.5	786.4	242.4	544.	52.8	41.2	5.	24.	8.	16.	.36	.88	.32	.56	1.72	.6	1.12	.045	1.3
3387	" 22	" 24	vd	m	.5	776.	195.2	580.8	50.	24.4	4.5	19.8	6.9	12.9	.144	.8	.32	.48	1.72	.6	1.12	.035	.8
3403	" 29	" 30	vd	m	.6	1397.6	169.2	1228.4	85.2	22.8	3.8	26.6	6.5	20.1	.196	1.44	.36	1.08	3.33	.57	2.76	.04	1.1
3451	April 12	April 13	d	c	.2	294.	211.2	82.8	29.2	25.2	4.	12.	7.9	4.1	.088	.44	.28	.16	.85	.69	.16	.04	1.
3474	" 19	" 20	d	c	.3	342.8	212.	130.8	33.2	30.4	3.8	13.	8.2	4.8	.036	.52	.4	.12	.93	.57	.36	.03	1.15
3504	" 26	" 27	d	c	.04	459.6	198.	261.6	32.4	24.8	4.5	15.2	8.	7.2	.042	.64	.28	.36	1.41	.77	.64	.035	.9
3534	May 3	May 4	d	m	.15	655.2	221.6	433.6	45.2	17.6	5.2	15.5	6.9	8.6	.112	.64	.36	.28	1.34	.66	.68	.04	.8
3556	" 10	" 11	d	c	.4	402.	257.2	144.8	36.8	31.2	7.	12.	6.7	5.3	.056	.52	.36	.16	.98	.54	.44	.035	.9
3594	" 17	" 19	d	m	.04	510.	238.	272.	46.	38.	5.2	15.4	7.5	7.9	.064	.52	.36	.16	1.38	.74	.64	.08	.7
3622	" 24	" 26	d	c	.5	500.	157.2	342.8	39.2	21.2	2.6	17.	9.3	7.7	.086	.64	.36	.28	1.54	.82	.72	.075	.6
3636	" 31	June 1	d	c	.3	513.6	204.4	309.2	25.6	22.	6.	14.4	7.6	6.8	.062	.52	.28	.24	1.22	.62	.6	.1	.55
3689	June 14	" 15	d	c	....	510.	246.	264.	29.6	26.	6.	12.9	6.5	6.4	.04	.32	.24	.08	1.16	.56	.6	.08	.35
3724	" 21	" 23	d	m	....	449.2	280.4	168.8	14.8	10.4	8.	12.2	7.6	4.6	.026	.36	.28	.08	.96	.64	.32	.125	.7
3759	" 28	" 29	d	c	.03	437.2	218.8	218.4	22.	16.8	7.4	10.7	6.	4.7	.003	.36	.24	.12	1.	.6	.4	.08	.2
3789	July 5	July 6	d	l	....	360.8	279.6	81.2	28.8	25.2	12.	8.2	8.	.2	.004	.24	.22	.02	.84	.6	.24	.125	.35
3819	" 12	" 13	d	c	.03*.1	324.4	266.8	57.6	15.2	12.	12.6	7.6	6.6	1.	.014	.32	.28	.04	.76	.6	.16	.12	.25
3846	" 19	" 20	d	l	.03*.1	306.4	279.6	26.8	15.6	13.2	11.	7.2	6.7	.5	.01	.32	.28	.04	.76	.64	.12	.07	.15
3880	" 26	" 27	d	c	.04	286.4	277.2	9.2	19.2	15.6	10.	7.7	6.5	1.2	.022	.38	.32	.06	.68	.48	.2	.035	.1

*Not filtered.

CHEMICAL EXAMINATION OF WATER FROM THE ILLINOIS RIVER AT KAMPSVILLE.—CONTINUED.
(Parts per 1,000,000.)

Serial Number.	1898 Date of Collection	Examination.	Appearance. Turbidity.	Sediment.	Color.	Residue on Evaporation. Total.	Dissolved.	Suspended.	Loss on Ignition. Total.	Dis-solved.	Chlorine.	Oxygen Consumed. Total.	By Dis-solved.	By Suspended Matt'r.	Nitrogen as Ammonia. Free Ammonia.	Albuminoid Ammonia. Total.	Dis-solved.	Sus-pended	Organic Nitrogen. Total.	Dissolved.	Suspended	Nitrogen as Nitrites.	Nitrates.
3909	Aug. 2	Aug. 3	d	c	.05	288.4	259.6	28.8	16.	15.2	12.	7.1	6.6	.5	.122	.4	.33	.07	.8	.68	.12	.008	.25
3940	" 9	" 11	d	l	.03	284.8	269.2	15.6	24.	22.4	13.	7.1	6.4	.7	.048	.32	.28	.04	.8	64	.16	.065	.45
3966	" 16	" 17	vd	m	....	566.8	160.8	406.	30.	20.	6.4	13.5	8.2	5.3	.192	.56	.24	.32	1.2	.4	.8	.045	.25
3983	" 23	" 24	d	c	.06	332.	208.	124.	22.	20.	13.	8.5	6.1	2.4	.006	.4	.28	.12	1.04	.56	.48	.165	.2
4022	" 30	Sept. 2	d	c	.03	373.6	320.8	52.8	40.	36.	35.	9.2	6.3	2.9	.024	.36	.24	.12	.8	.6	.2	.22	.3
4045	Sept. 6	" 8	d	c	.05	365.6	295.2	70.4	24.	23.	30.	8.4	6.4	2.	.028	.36	.32	.04	.68	.56	.12	.14	.25
4075	" 13	" 15	d	c	.05	324.	192.	132.	32.	28.	12.	9.5	6.2	3.3	.122	.4	.2	.2	.88	.52	.36	.06	.15
4094	" 20	" 22	d	c	.04	308.8	261.2	47.6	40.	28.	20.	7.6	5.	2.6	.028	.28	.2	.08	.56	.44	.12	.105	.3
4123	" 27	" 29	d	c	.03	396.	188.8	207.2	34.	22.	16.	11.6	6.3	5.3	.006	.48	.2	.28	.96	.48	.48	.09	.65
4166	Oct. 4	Oct. 6	d	c	.03	334.	259.2	74.8	34.	24.	20.	7.7	5.2	2.5	.08	.28	.2	.08	.64	.44	.2	.08	.55
4199	" 11	" 13	d	c	.04	322.8	272.4	50.4	29.2	28.4	17.	7.2	5.2	2.	.096	.32	.2	.12	.53	.41	.12	.065	.5
4232	" 18	" 19	d	c	.04	339.6	282.	57.6	32.8	28.	18.	6.5	5.4	1.1	.222	.24	.192	.048	.73	.53	.2	.08	.45
4260	" 25	" 26	d	c	.05	326.8	296.8	30.	28.8	26.	17.	6.2	5.1	1.1	.27	.24	.192	.048	.57	.45	.12	.09	.65
4304	Nov. 1	Nov. 4	d	l	.04	392.8	312.	80.8	30.	29.2	25.	8.	5.7	2.3	1.034	.34	.28	.06	.65	.41	.24	.035	1.
4335	" 8	" 10	d	c	.1	378.	278.	100.	28.	24.	15.	7.7	5.5	2.2	.6	.36	.24	.12	.63	.39	.24	.04	.65
4366	" 15	" 17	d	c	.03	348.	306.8	41.2	30.	26.	15.	7.3	5.5	1.8	.362	.28	.16	.12	.59	.39	.2	.03	.85
4398	" 22	" 24	d	c	.05	404.	316.8	87.2	44.	40.	15.	9.	6.	3.	.72	.3	.176	.124	.61	.47	.14	.037	.85
4442	" 29	Dec. 2	d	l	.04	348.	314.	34.	38.	34.8	11.	7.	5.4	1.6	.28	.32	.176	.144	.69	.45	.24	.06	1.15
4464	Dec. 6	" 8	d	l	.03	354.	341.2	12.8	68.	47.2	11.	6.5	5.9	.6	.36	.272	.176	.096	.65	.41	.24	.03	.6
4483	" 13	" 15	d	l	04*.06	374.	366.8	7.2	62.8	54.	16.	6.8	6.	.8	.48	.304	.272	.032	.65	.49	.16	.022	.25
4519	" 20	" 23	d	l	03*.05	357.2	354.8	2.4	48.4	46.	16.	7.2	6.	1.2	.66	.357	.224	.133	.73	.49	.24	.02	.2
4542	" 27	" 29	d	c	.03	353.2	329.6	23.6	43.2	42.8	15.	9.6	8.7	.9	.72	.36	.28	.08	.89	.65	.24	.02	.1
Average Jan. 4th—June 28th						541.8	235.6	306.2	37.	24.5	9.	15.8	7.5	8.3	.462	.648	.325	.323	1.32	.66	.66	.067	1.13
Average July 5th—Dec. 27th						352.	280.3	71.7	33.	28.1	15.8	8.	6.1	2.8	.25	.338	.236	.101	.74	.51	.23	.071	.44
Average Jan. 4th—Dec. 27th						444.6	259.3	185.3	34.8	26.4	12.6	11.7	6.8	4.9	.372	.483	.278	.205	1.02	.57	.43	.069	.76

Odor none. Color upon ignition generally brown, occasionally gray.
*Not Filtered.

CHEMICAL EXAMINATION OF WATER FROM THE ILLINOIS RIVER AT KAMPSVILLE.
(Parts per 1,000,000.)

Serial Number.	1899 Date of Collection.	1899 Date of Examination.	Appearance. Turbidity.	Appearance. Sediment.	Appearance. Color.	Residue on Evaporation. Total.	Residue on Evaporation. Dissolved.	Residue on Evaporation. Suspended.	Residue on Evaporation. Loss on Ignition. Total.	Residue on Evaporation. Loss on Ignition. Dissolved.	Chlorine.	Oxygen Consumed. Total.	Oxygen Consumed. By Dissolved.	Oxygen Consumed. By Suspended Matt'r	Nitrogen as Ammonia. Free Ammonia.	Nitrogen as Ammonia. Albuminoid Ammonia. Total.	Nitrogen as Ammonia. Albuminoid Ammonia. Dissolved.	Nitrogen as Ammonia. Albuminoid Ammonia. Suspended	Organic Nitrogen. Total.	Organic Nitrogen. Dissolved.	Organic Nitrogen. Suspended	Nitrogen as Nitrites.	Nitrogen as Nitrates.
4572	Jan. 3	Jan. 4	d	c	.4	358.8	325.2	33.6	44.	38.	36.	11.2	8.6	2.6	1.28	.4	.288	.112	.89	.65	.24	.025	.15
4595	" 10	" 11	d	c	.06	338.	296.8	41.2	26.	24.	14.	12.5	8.	4.5	1.12	.48	.36	.12	.93	.69	.24	.02	.25
4616	" 17	" 18	d	c	.15	374.	252.8	121.2	46.	44.	11.	14.8	8.3	6.5	.8	.52	.24	.28	1.05	.61	.44	.03	.6
4641	" 24	" 25	d	c	.15	316.	250.8	65.2	45.2	42.	9.6	12.5	7.3	5.2	.8	.48	.272	.208	.81	.53	.28	.03	.45
4666	" 31	Feb. 1	d	c	.1	288.8	260.	28.8	42.	36.	8.	?.6	7.1	2.5	.6	.32	.24	.08	.73	.53	.2	.022	.9
4683	Feb. 7	" 8	d	l	.1*.5	302.8	292.8	10.	44.	40.	10.2	8.5	7.	1.5	.76	.4	.256	.144	.7	.5	.2	.022	1.9
4701	" 14	" 15	d	l	.05*.2	340.	333.2	6.8	54.	48.	15.	9.7	7.3	2.4	.88	.368	.272	.096	.74	.54	.2	.016	1.65
4729	" 21	" 22	d	l	.1*.2	323.2	318.8	4.4	49.2	42.	15.	7.7	6.6	1.1	.96	.32	.256	.064	.7	.5	.2	.024	1.3
4755	" 28	Mar. 1	v d	vm	.5	692.	120.	572.	62.	28.	4.	26.	9.5	16.5	.82	1.04	.28	.76	1.94	.54	1.4	.016	.55
4780	Mar. 7	" 8	v d	vm	.7	830.	188.8	641.2	74.	44.	5.2	29.7	13.	16.7	.56	1.2	.384	.816	2.66	.86	1.8	.035	1.
4809	" 14	" 15	d	m	.3	1202.8	131.2	1071.6	98.	36.	5.	29.8	11.	18.8	.52	1.4	.336	1.064	3.	.66	2.34	.025	1.1
4843	" 21	" 24	v d	vm	.2	724.	164.	560.	74.	38.	4.2	27.	9.4	17.6	.4	.64	.24	.4	2.03	.55	1.48	.025	.65
4868	" 27	" 30	d	m	.1	430.8	188.	242.8	50.	38.	4.7	18.	11.7	6.3	.48	.64	.256	.384	1.23	.55	.68	.03	1.15
4891	April 4	April 5	d	c	.2	316.8	186.	130.8	54.	38.	5.6	13.5	8.3	5.2	.48	.4	.256	.144	.95	.51	.44	.03	1.35
4916	" 11	" 12	d	m	. . .	490.	198.	292.	44.	38.	5.4	17.2	7.7	9.5	.368	.56	.24	.32	.123	.51	.72	.033	1.3
4941	" 18	" 19	d	c	.05	418.4	247.2	171.2	48.	44.	6.6	12.7	8.	4.7	.28	.44	.36	.08	.83	.55	.28	.09	1.75
4965	" 25	" 26	d	c	.07	440.	326.	114.	46.	34.	7.	12.2	8.5	3.7	.096	.56	.32	.24	.93	.61	.32	.05	1.35
4986	May 2	May 3	d	m	.4	458.	272.8	185.2	57.2	30.8	7.2	13.7	8.8	5.4	.08	.48	.248	.232	1.21	.63	.58	.075	.45
5010	" 9	" 10	d	c	.05	496.8	280.8	216.	34.8	33.6	8.3	13.1	8.3	4.8	.01	.48	.272	.208	1.21	.81	.4	.075	.84
5042	" 16	" 17	d	c	.08	492.4	286.4	206.	25.6	18.8	8.8	13.9	8.3	5.6	.224	.512	.32	.192	1.37	.666	.704	.1	1.
5075	" 23	" 24	d	c	.03	490.	236.4	253.6	26.4	18.8	6.5	14.	10.1	3.9	.288	.448	.192	.256	1.37	.666	.704	.038	.68
5125	" 31	June 1	d	vm	.1	636.4	176.4	460.	48.4	24.8	4.	20.5	7.5	13.	.128	.672	.224	.448	1.61	.81	.8	.045	.88
5177	June 7	" 8	d	m	.15	536.8	214.8	322.	32.8	25.2	4.	15.4	8.8	6.6	.032	.48	.176	.304	1.53	.858	.672	.065	1.4
5212	" 14	" 15	d	m	.15	548.	305.6	242.4	36.8	35.6	9.	13.5	7.8	5.7	.112	.512	.288	.224	1.24	.664	.576	.032	1.6
5260	" 21	" 22	d	c	.25	601.6	272.8	328.8	48.8	26.	8.5	13.9	9.2	4.7	.048	.416	.304	.112	1.24	.76	.48	.034	1.2
5309	" 28	" 29	d	l	.06	369.6	285.6	84.	35.2	. . . .	10.	11.7	9.6	2.1	.024	.352	.288	.064	1.	.76	.24	.085	1.2
5347	July 5	Juy 6	d	c	.02	361.2	294.4	66.8	48.4	43.2	13.	11.1	9.4	1.7	.032	.19	.16	.032	1.	.792	.20	.11	1.36

*Not Filtered.

CHEMICAL EXAMINATION OF WATER FROM THE ILLINOIS RIVER AT KAMPSVILLE—CONTINUED.
(Parts per 1,000,000.)

Serial Number.	1899. Date of Collection.	1899. Date of Examination.	Appearance. Turbidity.	Appearance. Sediment.	Appearance. Color.	Residue on Evaporation. Total.	Residue on Evaporation. Dissolved.	Residue on Evaporation. Suspended.	Residue on Evaporation. Loss on Ignition. Total.	Residue on Evaporation. Loss on Ignition. Dissolved.	Chlorine.	Oxygen Consumed. Total.	Oxygen Consumed. By Dissolved.	Oxygen Consumed. By Suspended Matt'r	Nitrogen as Ammonia. Free Ammonia.	Nitrogen as Ammonia. Albuminoid Ammonia. Total.	Nitrogen as Ammonia. Albuminoid Ammonia. Dissolved.	Nitrogen as Ammonia. Albuminoid Ammonia. Suspended	Organic Nitrogen. Total.	Organic Nitrogen. Dissolved.	Organic Nitrogen. Suspended	Nitrogen as Nitrites.	Nitrogen as Nitrates.
5402	July 12	July 13	d	c	.2	304.8	257.2	47.6	53.2	33.2	10.	9.7	8.9	.8	.064	.384	.224	.16	.84	.536	.304	.1	.92
5445	" 19	" 20	d	l	.1	310.4	285.2	25.2	47.2	42.	16.3	11.6	10.6	1.	.04	.32	.224	.096	.92	.724	.196	.056	1.2
5493	" 26	" 27	d	c	.07	344.4	324.4	20.	33.6	32.	30.	9.6	9.5	.1	.064	.32	.256	.064	.92	.728	.192	.19	.4
5541	Aug. 2	Aug. 3	d	l	.25	316.	278.4	37.6	46.8	46.	22.	10.5	10.3	.2	.024	.24	.192	.048	.696	.6	.096	.1	1.12
5615	" 11	" 12	d	m	.05	372.8	147.6	225.2	44.	22.8	7.9	11.	7.6	3.4	.16	.288	.132	.156	.84	.488	.352	.065	.48
5643	" 16	" 17	d	l	.2	263.6	244.	19.6	62.8	56.	16.5	9.3	8.5	.8	.08	.304	.176	.128	1.	.456	.544	.1	.8
5703	" 23	" 24	d	c	. . .	328.8	270.8	58.	40.	39.2	18.	8.5	8.	.5	.056	.352	.212	.14	.88	.632	.248	.07	.72
5746	" 30	" 31	d	c	.03	341.2	272.8	68.4	64.	37.6	18.	11.5	9.1	2.4	.04	.4	.192	.208	1.24	.552	.688	.1	.68
5802	Sept. 6	Sept. 7	d	c	.05	309.6	283.6	26.	41.2	40.4	20.	8.4	5.8	2.6	.144	.336	.256	.08	1.	.792	.208	.04	.32
5850	" 13	" 14	d	c	.04	346.4	312.	34.4	34.	25.2	22.3	8.5	6.	2.5	.24	.352	.304	.048	.84	.6	.24	.06	.48
5900	" 20	" 21	d	c	.04	311.6	222.	89.6	21.2	21.2	16.5	8.7	6.9	1.8	.36	.352	.224	.128	1.	.472	.528	.04	.68
5961	" 27	" 28	d	l	.06	305.2	270.4	34.8	20.4	20.4	26.4	8.1	7.4	.7	.3	.336	.272	.064	.82	.58	.24	.03	.6
6000	Oct. 4	Oct. 5	d	l	.03	286.	264.	22.	36.	36.	25.7	9.5	8.7	.8	.324	.32	.288	.032	.676	.628	.048	.03	.48
6051	" 11	" 12	d	l	.04	327.2	308.8	18.4	27.2	26.4	32.	8.9	7.1	1.8	.164	.288	.272	.016	.804	.392	.412	.024	.64
6098	" 18	" 19	d	l	.07	330.4	321.6	8.8	27.2	25.2	38.5	8.2	8.	.2	.16	.368	.272	.096	1.08	.776	.304	.02	.56
6167	" 25	" 26	d	c	.04	344.	309.2	34.8	19.6	17.2	37.1	7.	6.9	.1	.296	.352	.24	.112	.872	.584	.288	.035	1.08
6214	Nov. 1	Nov. 3	d	c	.04	370.4	336.	34.4	21.6	. . . .	38.6	7.3	7.1	.2	.552	.4	.268	.132	.744	.52	.224	.045	1.
6255	" 8	" 9	d	c	.05	365.6	362.8	2.8	30.	28.8	41.	7.1	6.6	.5	.512	.336	.24	.096	.744	.616	.128	.12	1.68
6345	" 22	" 23	d	c	.03	373.6	325.2	48.4	28.8	24.4	34.5	8.	6.4	1.6	.688	.752	.288	.464	1.64	.704	.936	.05	1.6
6411	" 29	" 30	d	c	.02	342.4	316.8	25.6	34.4	31.6	32.	6.9	6.8	.1	1.44	.368	.272	.096	.936	.584	.352	.046	1.32
6463	Dec. 6	Dec. 9	d	c	.03	344.8	342.4	2.4	37.6	37.2	34.	8.6	5.7	2.9	1.184	.56	.24	.32	1.384	.776	.608	.04	1.76
6516	" 13	" 14	d	c	.06	341.6	321.6	20.	37.6	35.6	26.	9.9	7.2	2.7	.368	.752	.208	.544	1.48	.584	.896	.035	1.8
6572	" 20	" 22	d	c	.04	324.8	292.	32.8	34.	32.	19.8	10.5	7.4	3.1	.672	.48	.256	.224	1.	.552	.448	.04	1.08
Average Jan. 3rd—June 28th						492.9	246.5	246.3	47.9	34.6	8.9	15.4	8.6	6.8	.448	.558	.276	.282	1.274	.635	.639	.041	1.02
Average July 5th—Dec. 20th						331.9	290.1	41.8	37.1	32.7	24.8	9.1	7.7	1.3	.331	.381	.236	.145	.973	.611	.362	.064	.95
Average Jan. 3rd—Dec. 20th						415.6	267.4	148.1	42.7	33.7	16.5	12.4	8.2	4.1	.392	.473	.257	.216	1.129	.623	.506	.052	.98

Odor none, Color upon ignition generally brown, occasionally gray.

CHEMICAL EXAMINATION OF WATER FROM THE ILLINOIS RIVER AT KAMPSVILLE.
(Parts per 1,000,000.)

Serial Number.	1900 Date of Collection.	1900 Date of Examination.	Appearance. Turbidity.	Appearance. Sediment.	Appearance. Color.	Residue on Evaporation. Total.	Residue on Evaporation. Dissolved.	Residue on Evaporation. Suspended.	Residue on Evaporation. Loss on Ignition. Total.	Residue on Evaporation. Loss on Ignition. Dissolved.	Chlorine.	Oxygen Consumed. Total.	Oxygen Consumed. By Dissolved.	Oxygen Consumed. By Suspended Matt'r	Nitrogen as Ammonia. Free Ammonia.	Nitrogen as Ammonia. Albuminoid Ammonia. Total.	Nitrogen as Ammonia. Albuminoid Ammonia. Dissolved.	Nitrogen as Ammonia. Albuminoid Ammonia. Suspended	Organic Nitrogen. Total.	Organic Nitrogen. Dissolved.	Organic Nitrogen. Suspended	Nitrogen as Nitrites.	Nitrogen as Nitrates.
6609	Jan. 3	Jan. 4	d	l	.08*.15	389.6	379.6	10.	45.6	42.	31.5	8.1	8.	.1	2.24	.432	.304	.128	.84	.616	.224	.06	1.68
6704	" 17	" 18	d	c	.03	343.2	338.4	4.8	50.8	47.6	17.	7.2	6.6	.6	1.28	.384	.272	.112	.8	.64	.16	.036	2.6
6755	" 25	" 26	d	c	.2	382.4	218.	164.4	32.8	21.6	10.	13.7	6.8	6.9	1.04	.448	.224	.224	1.12	.32	.8	.03	2.
6794	" 31	Feb. 1	d	c	.05	330.8	305.2	25.6	16.	13.2	19.	8.6	8.3	.3	1.6	.368	.24	.128	.88	.576	.304	.027	1.8
6862	Feb. 7	" 8	d	c	.03	428.8	270.	158.8	28.8	28.8	16.	12.2	7.3	4.9	1.6	.512	.272	.24	1.04	.544	.496	.018	1.84
6908	" 14	" 15	v d	v m	.06	1240.8	193.6	1047.2	71.2	26.	9.	17.8	7.	10.8	.736	1.376	.208	1.168	3.2	.416	2.784	.023	1.72
6964	" 21	" 23	d	m	.....	768.8	180.4	588.4	90.8	20.8	7.6	16.9	7.1	9.8	.672	.736	.336	.4	2.32	.608	1.712	.022	2.
7050	Mar. 7	Mar. 8	d	c	.04	917.2	178.8	738.4	43.6	14.8	6.4	17.3	6.4	10.9	.656	.608	.208	.4	1.84	.544	1.296	.015	1.64
7093	" 14	" 16	v d	v m	.3	905.2	136.4	768.8	30.	13.6	4.1	17.2	5.8	11.4	.32	.672	.192	.48	1.92	.32	1.6	.013	1.04
7126	" 21	" 22	d	m	.1	534.8	165.2	369.6	34.8	20.	4.6	16.	8.	8.	.368	.496	.208	.288	1.24	.6	.64	.013	1.2
7181	" 28	" 29	d	c	.4	311.2	147.6	163.6	26.	15.6	4.8	11.5	8.5	3.	.432	.304	.192	.112	.984	.504	.48	.012	1.4
7230	April 4	April 5	d	c	.3	292.	144.4	147.6	24.	8.4	4.2	11.	6.9	4.1	.336	.288	.176	.112	.664	.44	.224	.015	1.32
7291	" 11	" 12	d	c	.3	331.2	166.8	164.4	20.	18.8	5.3	11.6	7.7	3.9	.272	.32	.192	.128	.696	.568	.128	.035	1.64
7347	" 18	" 19	d	c	.3	325.6	190.8	134.8	26.4	26.4	5.4	11.8	6.8	5.	.208	.352	.256	.096	.92	.824	.096	.03	2.08
7414	" 25	" 26	d	c	.2	353.2	224.	129.2	39.2	20.4	6.6	11.3	7.1	4.2	.144	.336	.208	.128	.824	.568	.256	.036	1.12
7452	May 2	May 3	d	c	.03	402.8	251.6	151.2	35.6	26.4	8.6	12.5	7.4	5.1	.096	.512	.224	.288	1.38	.484	.896	.03	1.6
7492	" 9	" 10	d	c	.03	457.6	233.6	224.	26.	24.8	9.	13.	7.7	5.3	.128	.48	.224	.256	1.	.484	.516	.025	1.
7600	" 23	" 24	v d	v m	.05	515.6	268.8	246.8	48.4	44.8	10.2	13.8	8.4	5.4	.256	.416	.224	.192	.964	.58	.384	.04	.8
7634	" 30	" 31	d	m	.05	444.	262.	182.	42.	36.8	14.	12.5	6.8	5.7	.186	.368	.256	.112	1.092	.548	.544	.06	1.36
7668	June 6	June 7	d	c	.03	399.2	248.	151.2	49.6	47.6	14.	11.3	8.2	3.1	.096	.336	.208	.128	.772	.52	.252	.09	1.48
7721	" 13	" 14	d	c	.03	430.8	270.4	160.4	47.6	27.6	15.	9.4	6.4	3.	.048	.32	.224	.096	1.	.5	.5	.05	1.76
7759	" 20	" 21	d	m	.05	377.6	262.8	114.8	44.	23.2	13.	8.7	6.	2.7	.032	.256	.192	.064	.516	.402	.114	.03	1.48
7799	" 27	" 28	d	vs	.1	392.4	295.6	96.8	82.4	56.	15.	8.7	6.3	2.4	.032	.304	.24	.064	.744	.564	.18	.08	1.24
7832	July 4	July 5	d	vl	.05	335.2	248.4	86.8	28.	27.2	16.5	8.9	6.3	2.6	.048	.208	.192	.016	.452	.388	.064	.035	1.36
7910	" 11	" 12	d	l	.03	266.	222.	44.	22.4	17.2	15.	6.	6.	0.0	.096	.176	.16	.016	.452	.372	.08	.06	1.52
7961	" 18	" 19	d	l	.01	281.2	233.2	48.	35.2	18.	15.	7.1	4.6	2.5	.048	.192	.176	.016	.5	.308	.192	.04	1.08
8025	" 25	" 26	d	l	.01	280.8	240.4	40.4	41.2	27.2	20.	6.3	5.2	1.1	.152	.272	.176	.096	.616	.244	372	.07	1.52

*Not Filtered.

CHEMICAL EXAMINATION OF WATER FROM THE ILLINOIS RIVER AT KAMPSVILLE —CONTINUED.
(Parts per 1,000,000.)

Serial Number.	1900. Date of Collection.	1900. Date of Examination.	Appearance. Turbidity.	Appearance. Sediment.	Appearance. Color.	Residue on Evaporation. Total.	Residue on Evaporation. Dissolved.	Residue on Evaporation. Suspended.	Loss on Ignition. Total.	Loss on Ignition. Dissolved.	Chlorine.	Oxygen Consumed. Total.	Oxygen Consumed. By Dissolved.	Oxygen Consumed. By Suspended Matt'r	Nitrogen as Ammonia. Free Ammonia.	Albuminoid Ammonia. Total.	Albuminoid Ammonia. Dissolved.	Albuminoid Ammonia. Suspended	Organic Nitrogen. Total.	Organic Nitrogen. Dissolved.	Organic Nitrogen. Suspended	Nitrogen as Nitrites.	Nitrogen as Nitrates.
8084	Aug. 1	Aug. 3	d	1	.02	253.6	240.	13.6	28.	24.	20.	5.1	4.6	.5	.112	.224	.208	.016	.74	.58	.16	.04	1.28
8141	" 7	" 10	d	1	.01	282.8	238.	44.8	40.8	25.6	20.	5.1	5.	.1	.144	.24	.224	.016	.728	.36	.368	.045	.92
8193	" 15	" 17	d	1	.01	276.	231.2	44.8	35.2	....	19.	6.9	4.9	2.	.112	.32	.176	.144	.676	.316	.36	.04	.96
8272	" 22	" 24	d	1	.2	348.	61.2	286.8	30.4	16.4	15.	8.8	4.7	4.1	.144	.352	.16	.192	.972	.268	.704	.01	.92
8333	" 29	" 30	d	1	.02	312.8	210.8	102.	29.6	24.	17.	7.8	5.	2.8	.112	.32	.128	.192	.72	.38	.34	.04	1.08
8387	Sept. 5	Sept. 6	..		.02	326.8	221.2	105.6	22.	12.8	15.	7.4	4.4	3.	.112	.288	....	....	.472	.4	.072	.05	1.04
8456	" 12	" 13	d	c	.03	297.2	248.4	48.8	23.6	16.8	18.	7.7	5.8	1.9	.112	.288	.24	.048	.7	.4	.3	.035	1.
8507	" 19	" 20	d	c	.1	294.4	232.4	62.	24.8	22.	16.	7.7	5.4	2.3	.128	.32	.128	.192	.536	.416	.12	.04	1.
8560	" 26	" 27	d	c	...	302.	248.8	53.2	32.4	24.	18.	6.3	5.9	.4	.16	.272	.256	.016	.7	.672	.028	.075	.88
8614	Oct. 3	Oct. 4	d	c	.04	314.8	250.8	64.	37.2	25.6	18.	7.5	5.9	.6	.128	.304	.256	.048	.8	.544	.256	.06	1.28
8652	" 10	" 11	s	1	.03	318.4	262.4	56.	29.6	24.4	23.	6.4	6.2	.2	.28	.272	....	....	.8	.512	.288	.07	1.49
8675	" 15	" 17	d	c	.01	300.8	252.	48.8	28.	24.8	22.	7.	6.3	.7	.4	.304	.176	.128	.672	.432	.24	.06	1.58
8701	" 24	" 25	d	1	.01	278.	236.8	41.2	24.8	22.4	18.	6.1	5.6	.5	.176	.224	.128	.096	.672	.464	.208	.048	1.332
8727	" 29	" 31	d	1	...	265.6	230.	35.6	22.4	20.8	16.	5.7	5.3	.4	.064	.192	.096	.096	.72	.596	.124	.02	1.42
8753	Nov. 5	Nov. 7	d	1	.02	276.8	232.	44.8	25.6	24.	17.	5.6	5.3	.3	.304	.224	.208	.016	.64	.464	.176	.04	1.44
8780	" 13	" 14	d	1	.02	327.6	249.2	78.4	19.2	16.8	18.	6.6	5.2	1.4	.336	.256	.224	.032	.704	.544	.16	.03	1.89
8796	" 19	" 20	d	1	.1	259.6	244.8	14.8	22.4	21.6	19.5	6.2	5.7	.5	.288	.368	.24	.128	1.008	.752	.256	.03	1.65
8829	" 26	" 27	d	1	.04	266.4	236.8	29.6	24.8	23.2	15.	5.1	4.6	.5	.464	.228	.176	.112	.608	.496	.112	.025	1.095
8856	Dec. 3	Dec. 4	d	1	.08	279.2	260.4	18.8	26.	24.	12.	6.2	5.4	.8	.496	.24	.128	.112	.528	.432	.096	.03	1.49
8890	" 11	" 12	d	1	.15	276.	269.2	6.8	24.4	22.8	11.	6.8	6.5	.3	.408	.256	.144	.112	.704	.432	.272	.028	1.932
8901	" 17	" 18	d	1	.2	290.8	272.4	18.4	27.2	26.	11.	7.	6.8	.2	.544	.32	.256	.064	.752	.528	.224	.022	1.978
8922	" 24	" 26	d	1	.05	293.6	276.	17.6	32.	30.4	12.	7.6	7.4	.2	.624	.352	.272	.084	.784	.688	.096	.025	1.455
Average Jan. 3rd—June 27th						442.3	231.8	210.5	41.5	27.1	10.8	12.2	7.1	5.1	.54	.461	.229	.232	1.164	.485	.679	.035	1.556
Average July 4th—Dec. 24th						292.8	236.4	56.3	28.3	23.4	16.8	6.7	5.5	1.2	.232	.272	.181	.091	.675	.453	.222	.041	1.33
Average Jan. 3rd—Dec. 24th						385.2	234.3	150.9	34.5	25.1	14.	9.3	6.3	3.	.381	.359	.204	.154	.904	.488	.416	.038	1.436

CHEMICAL EXAMINATION OF WATER FROM THE ILLINOIS RIVER AT GRAFTON.
(Parts per 1,000,000.)

Serial Number.	1899 Date of Collection.	1899 Date of Examination.	Appearance. Turbidity.	Appearance. Sediment.	Appearance. Color.	Residue on Evaporation. Total.	Residue on Evaporation. Dissolved.	Residue on Evaporation. Suspended.	Residue on Evaporation. Loss on Ignition. Total.	Residue on Evaporation. Loss on Ignition. Dissolved.	Chlorine.	Oxygen Consumed. Total.	Oxygen Consumed. By Dissolved.	Oxygen Consumed. By Suspended Matt'r	Nitrogen as Ammonia. Free Ammonia.	Nitrogen as Ammonia. Albuminoid Ammonia. Total.	Nitrogen as Ammonia. Albuminoid Ammonia. Dissolved.	Nitrogen as Ammonia. Albuminoid Ammonia. Suspended	Organic Nitrogen. Total.	Organic Nitrogen. Dissolved.	Organic Nitrogen. Suspended	Nitrogen as Nitrites.	Nitrogen as Nitrates.
4555	Dec. 31	Jan. 3	d	c	.2	400.	333.6	66.4	58.	40.	13.5	13.7	8.9	4.8	.92	.48	.272	.208	.89	.61	.28	.032	.5
4587	Jan. 5	" 7	d	c	.05	326.8	282.8	44.8	40.	34.	12.8	10.8	8.1	2.7	.92	.36	.256	.104	.89	.49	.4	.017	.3
4629	" 18	" 20	d	c	.05	532.8	238.	294.8	64.	46.	9.	16.5	7.3	9.2	.6	.56	.224	.336	1.29	.53	.76	.025	.6
4647	" 25	" 27	d	c	.2	400.8	248.8	152.	36.	32.	9.4	13.8	8.	5.8	.64	.44	.24	.2	.79	.53	.26	.075	.65
4667	Feb. 1	Feb. 3	d	l	.05	330.	250.8	79.2	44.	42.	7.6	10.2	7.	3.2	.514	.36	.192	.168	.73	.49	.24	.07	.7
4710	" 15	" 17	d	l	.05	337.2	328.	9.2	46.	42.	11.4	7.2	6.8	.4	.68	.288	.224	.064	.74	.54	.2	.021	1.4
4737	" 22	" 24	d	l	.08*.1	336.	326.	10.	48.	40.	12.6	7.	6.6	.4	.84	.304	.24	.064	.62	.54	.08	.03	1.35
4770	Mar. 2	Mar. 4	d	m	1.	958.	187.2	770.8	84.	38.	2.	34.	13.5	20.5	.26	1.32	.384	.936	2.66	.66	2.	.03	.8
4783	" 8	" 10	d	m	.05	1220.	152.8	1067.2	108.	32.	4.6	36.	15.5	20.5	.52	1.48	.32	1.16	3.14	.74	2.4	.027	1.
4825	" 15	" 17	d	m	.4	1242.	144.	1098.	102.	36.	4.6	36.5	10.5	26.	.44	1.4	.256	1.144	2.9	.66	2.24	.025	1.2
4845	" 23	" 25	d	m	.3	1094.8	140.	954.8	104.	38.	4.6	38.3	15.4	22.9	.36	1.24	.32	.92	3.31	.75	2.56	.04	.8
4875	" 29	" 31	d	m	.02	432.8	178.	254.8	48.	34.	5.	15.8	9.	6.8	.32	.52	.224	.296	1.15	.51	.64	.055	1.55
4920	Apr. 12	April 14	d	c	.07	424.	206.	218.	38.	32.	5.6	14.6	7.6	7.	.304	.448	.224	.224	.87	.43	.44	.017	1.7
4945	" 19	" 21	d	c	.04	372.	238.	134.	40.	36.	6.4	11.9	7.5	4.4	.24	.36	.192	.168	.83	.47	.36	.08	1.5
4972	" 26	" 28	d	c	.09	300.	257.2	42.8	36.	33.2	6.8	11.	7.5	3.5	.072	.4	.24	.16	.93	.53	.4	.044	.95
5005	May 3	May 5	d	c	.03	329.3	266.4	62.9	42.	39.2	7.8	10.2	7.2	3.	.096	.44	.272	.168	1.21	.53	.68	.052	1.05
5024	" 10	" 12	d	c	.04	323.2	258.	65.2	25.6	20.8	7.1	9.9	9.14	.76	.128	.352	.288	.064	.89	.7	.19	.08	.72
5059	" 17	" 19	d	c	.04	350.4	300.4	50.	42.8	38.2	9.	10.	8.8	1.2	.08	.32	.288	.032	.89	.73	.16	.02	1.08
5092	" 24	" 26	d	c	.4	332.	231.6	100.4	28.8	25.6	7.1	7.	6.6	.4	.384	.416	.288	.128	.89	.76	.13	.06	1.56
5135	" 31	June 1	d	m	.1	674.8	174.	500.8	51.2	21.4	3.6	16.8	7.9	8.9	.08	.576	.288	.288	1.53	.57	.96	.042	.52
5185	June 7	" 9	d	m	.7	442.4	263.2	179.2	45.2	42.4	4.5	9.4	8.6	.8	.008	.4	.224	.176	1.37	.666	.704	.011	.96
5222	" 14	" 16	d	m	.2	358.	254.4	113.6	25.2	24.	8.	12.7	9.	3.7	.128	.512	.288	.224	1.	.856	.144	.007	1.4
5262	" 21	" 23	d	c	.3	343.6	276.4	67.2	24.	23.2	7.	11.2	8.9	2.3	.096	.352	.176	.176	.92	.6	.32	.019	1.24
5323	" 28	" 30	d	c	.05	300.8	300.	.8	19.6	....	9.4	9.5	9.2	.3	.04	.224	.192	.032	.68	.6	.08	.033	.96
5351	July 5	July 6	d	l	.02	284.	218.	66.2	44.	....	10.7	10.8	9.3	1.5	.06	.32	.256	.064	.92	.64	.28	.054	1.2
5411	" 12	" 14	d	l	.1*.2	316.8	274.4	42.4	34.4	27.2	10.4	8.9	7.8	1.1	.176	.352	.256	.096	.76	.568	.192	.165	.96
5453	" 19	" 20	d	l	.04	503.6	286.4	217.2	86.8	48.	13.9	10.4	9.4	1.	.04	.32	.304	.016	.92	.696	.224	.08	1.04

*Not filtered.

CHEMICAL EXAMINATION OF WATER FROM THE ILLINOIS RIVER AT GRAFTON.—CONTINUED.
(Parts per 1,000,000.)

Serial Number.	1899 Date of Collection.	1899 Date of Examination.	Appearance. Turbidity.	Appearance. Sediment.	Appearance. Color.	Residue on Evaporation. Total.	Residue on Evaporation. Dissolved.	Residue on Evaporation. Suspended.	Loss on Ignition. Total.	Loss on Ignition. Dissolved.	Chlorine.	Oxygen Consumed. Total.	Oxygen Consumed. By Dissolved.	Oxygen Consumed. By Suspended Matt'r	Nitrogen as Ammonia. Free Ammonia.	Albuminoid Ammonia. Total.	Albuminoid Ammonia. Dissolved.	Albuminoid Ammonia. Suspended	Organic Nitrogen. Total.	Organic Nitrogen. Dissolved.	Organic Nitrogen. Suspended	Nitrogen as Nitrites.	Nitrogen as Nitrates.
5498	July 26	July 27	d	l	.1	343.2	314.8	28.4	50.8	46.	22.8	12.	9.9	2.1	.052	.384	.256	.128	1.	.728	.272	.1	.84
5543	Aug. 2	Aug. 3	d	l	.25	348.4	314.4	34.	59.2	52.4	32.	10.2	9.7	.5	.024	.272	.224	.048	.792	.68	.112	.096	1.2
5598	" 9	" 10	d	c	.04	374.	187.2	186.8	54.	34.4	15.	11.3	8.1	3.2	.01	.256	.112	.144	1.08	.36	.72	.07	.72
5642	" 16	" 17	d	c	.15	282.8	178.8	104.	75.6	47.6	6.9	11.9	9.3	2.6	.04	.368	.24	.128	1.08	.504	.576	.07	.64
5696	" 21	" 24	d	c	.05	308.8	273.2	35.6	44.	43.2	16.7	9.1	7.1	2.	.024	.384	.224	.16	.92	.544	.376	.05	.6
5747	" 30	" 31	d	c	.03	297.2	256.	41.2	28.	27.6	14.	10.	9.	1.	.044	.288	.176	.112	.92	.488	.432	.05	.52
5805	Sept. 6	Sept. 7	d	c	.04	324.4	294.	30.4	36.	33.2	19.7	9.1	5.9	3.2	.084	.4	.272	.128	1.08	.76	.32	.009	.4
5852	" 13	" 14	d	c	.04	320.	296.4	23.6	37.6	34.	19.2	7.9	6.	1.9	.24	.352	.24	.112	.84	.552	.288	.05	.52
5902	" 20	" 21	d	c	.03	344.8	287.2	57.6	24.4	24.	22.3	8.4	6.8	1.6	.18	.288	.224	.064	.84	.536	.304	.045	.6
5959	" 27	" 28	d	l	.06	290.	256.	34.	23.6	17.6	22.4	8.6	7.3	1.3	.396	.272	.256	.016	.82	.58	.24	.04	1.
6001	Oct. 4	Oct. 5	d	l	.05	266.8	226.6	40.2	36.8	30.8	19.3	9.1	8.3	.8	.192	.336	.272	.064	.708	.612	.096	.018	.48
6045	" 11	" 12	d	l	.4	331.6	300.4	31.2	33.2	13.6	28.9	8.3	8.	.3	.172	.32	.24	.08	.98	.628	.352	.023	.72
6166	" 25	" 26	d	c	.03	320.8	282.	38.8	32.8	29.6	28.	7.4	6.9	.5	.084	.368	.224	.144	.84	.472	.368	.022	.8
6205	Nov. 1	Nov. 2	d	c	.15	340.	257.6	82.4	22.8	17.6	26.3	8.2	7.4	.8	.404	.368	.256	.112	.648	.52	.128	.03	1.12
6257	" 8	" 9	d	l	.06	362.	334.4	27.6	40.4	32.	36.6	7.8	6.5	1.3	.48	.32	.272	.048	.84	.44	.4	.06	1.48
6306	" 15	" 16	d	c	.03	353.6	318.	35.6	53.6	46.4	42.5	9.3	6.2	3.1	.12	.96	.352	.608	1.896	.584	1.312	.175	1.08
6347	" 22	" 23	d	c	.02	385.2	329.2	56.	29.6	27.2	32.5	9.	7.2	1.8	.16	.752	.224	.528	1.8	.68	1.12	.05	1.6
6412	" 29	" 30	d	c	.02	339.2	306.	33.2	33.6	30.4	27.	8.	6.6	1.4	.88	.352	.304	.048	1.064	.68	.384	.045	1.68
6462	Dec. 6	Dec. 7	d	c	.03	342.	328.	14.	25.6	25.2	31.5	9.4	4.7	4.7	1.12	.512	.224	.288	1.256	.744	.512	.036	1.68
6519	" 13	" 14	d	c	.07	346.4	315.6	30.8	45.2	36.4	24.	10.6	6.4	4.2	.176	.704	.24	.464	1.64	.456	1.184	.025	1.68
6559	" 20	" 22	d	c	.02	364.8	299.2	65.6	33.6	31.6	22.2	11.7	7.7	4.	.432	.672	.24	.432	1.16	.648	.512	.03	1.68
6585	" 27	" 28	d	c	.03	329.2	282.	47.2	27.2	18.	20.2	12.7	8.8	3.9	.88	.512	.224	.288	1.08	.616	.464	.026	1.68
Average Dec. 31–June 28..........						507.1	243.1	264.	50.	34.3	7.7	15.6	8.9	6.6	.361	.564	.254	.31	1.297	.604	.692	.038	1.092
Average July 5–Dec. 27............						336.1	279.1	57.	39.9	32.2	21.7	9.6	7.6	1.9	.264	.394	.24	.154	.999	.589	.41	.051	1.035
Average Dec. 31–'98– Dec. 27–'98						421.6	261.1	160.5	44.9	33.2	14.7	12.6	8.3	4.3	.313	.479	.247	.232	1.148	.596	.551	.045	1.063

Odor none. Color upon ignition generally brown, occasionally gray.

CHEMICAL EXAMINATION OF WATER FROM THE ILLINOIS RIVER AT GRAFTON.
(Parts per 1,000,000.)

Serial Number.	1900. Date of Collection.	1900. Date of Examination.	Appearance. Turbidity.	Appearance. Sediment.	Appearance. Color.	Residue on Evaporation. Total.	Residue on Evaporation. Dissolved.	Residue on Evaporation. Suspended.	Residue on Evaporation. Loss on Ignition. Total.	Residue on Evaporation. Loss on Ignition. Dissolved.	Chlorine.	Oxygen Consumed. Total.	Oxygen Consumed. By Dissolved.	Oxygen Consumed. By Suspended Matt'r	Nitrogen as Ammonia. Free Ammonia.	Nitrogen as Ammonia. Albuminoid Ammonia. Total.	Nitrogen as Ammonia. Albuminoid Ammonia. Dissolved.	Nitrogen as Ammonia. Albuminoid Ammonia. Suspended	Organic Nitrogen. Total.	Organic Nitrogen. Dissolved.	Organic Nitrogen. Suspended	Nitrogen as Nitrites.	Nitrogen as Nitrates.
6626	Jan. 4	Jan. 5	d	c	.04	395.2	382.	13.2	40.4	38.8	30.	11.8	8.3	3.5	2.24	.416	.288	.128	.92	.552	.368	.07	1.76
6655	" 10	" 11	d	l	.03	368.	365.2	2.8	28.4	28.	26.7	7.5	7.4	.1	2.16	.432	.304	.128	.792	.6	.192	.03	2.28
6705	" 17	" 18	d	c	.03	338.4	329.6	8.8	47.6	44.4	15.5	7.2	6.5	.7	.704	.32	.208	.112	.72	.554	.176	.03	2.4
6751	" 24	" 25	d	m	.2	502.4	216.	286.4	40.	22.4	10.	16.	8.1	7.9	.8	.512	.208	.304	1.12	.704	.416	.03	2.
6802	" 31	Feb. 2	d	c	.02	439.2	311.2	128.	38.	29.2	21.	10.	8.1	1.9	1.6	.352	.208	.144	.88	.576	.304	.032	2.2
6864	Feb. 7	" 8	d	c	.03	326.8	271.2	55.6	18.4	12.4	17.	10.9	7.7	3.2	1.36	.384	.176	.208	.8	.576	.224	.018	1.6
6913	" 14	" 15	v d	v m	.6	1481.6	170.4	1311.2	72.4	45.6	5.1	24.7	7.9	16.8	.544	1.376	.288	1.088	3.52	.544	2.976	.013	1.44
6956	" 21	" 23	d	m	.2	732.8	202.	530.8	83.6	29.2	8.	16.9	8.3	8.6	.704	.864	.272	.592	1.28	.64	.64	.023	2.
6992	" 28	Mar. 2	d	m	.3	729.2	218.8	510.4	100.	32.4	7.	16.1	6.2	9.9	.528	.64	.272	.368	1.68	.64	1.04	.018	2.
7035	Mar. 7	" 8	d	m	.05	973.2	178.	795.2	56.8	18.8	6.4	17.6	6.4	11.2	.528	.736	.264	.472	1.92	.544	1.376	.012	1.44
7082	" 14	" 15	d	m	.2	799.2	153.2	646.	45.2	21.6	4.2	16.2	6.2	10.	.32	.608	.208	.4	1.6	.384	1.216	.011	1.4
7130	" 21	" 22	d	c	.15	807.6	133.6	674.	40.8	18.4	4.7	17.9	6.	11.9	.288	.864	.176	.688	1.88	.6	1.28	.011	1.32
7185	" 28	" 29	d	c	.04	544.4	149.2	395.2	34.	13.2	4.3	14.	6.	8.	.256	.416	.176	.24	1.112	.408	.704	.01	1.52
7226	April 3	April 4	d	c	.06	399.2	151.2	248.	13.6	13.2	4.9	12.1	6.1	6.5	.224	.352	.144	.208	.76	.44	.32	.013	1.6
7282	" 10	" 11	d	c	.3	364.	171.2	192.8	12.	10.	4.7	12.	6.9	5.1	.224	.301	.208	.096	.824	.568	.256	.025	1.32
7334	" 17	" 18	d	c	.04	354.8	193.2	161.6	34.4	30.	5.4	10.9	6.7	4.2	.144	.304	.176	.128	1.016	.44	.576	.035	1.72
7423	" 25	" 26	d	c	.2	316.8	216.	100.8	36.	27.2	6.2	10.5	6.7	3.8	.128	.272	.208	.064	.952	.504	.448	.036	1.12
7450	May 2	May 3	d	c	.38	246.	127.6	118.4	24.4	18.8	9.3	12.8	7.5	5.3	.096	.32	.208	.112	.92	.6	.32	.017	.64
7500	" 9	" 10	d	c	.03	368.	229.6	138.4	24.8	22.4	8.4	12.	7.6	4.4	.144	.384	.256	.128	1.38	.548	.832	.03	.96
7561	" 16	" 17	d	c	.02	329.2	253.6	75.6	36.	34.8	10	10.9	7.5	3.4	.072	.32	.208	.112	.804	.452	.352	.04	.76
7603	" 23	" 24	v d	v m	.05	374.8	265.2	109.6	46.8	37.2	10.5	11.4	9.4	2.	.064	.32	.192	.128	.74	.36	.38	.038	.9
7627	" 30	" 31	d	c	.07	364.	265.6	98.4	40.8	26.8	14.	10.8	7.6	3.2	.032	.32	.208	.112	.84	.52	.32	.024	1.48
7674	June 6	June 7	d	c	.03	352.	243.6	108.4	36.	35.6	12.	9.5	6.6	2.9	.032	.288	.16	.128	.8	.468	.332	.008	1.4
7722	" 13	" 14	d	c	.04	360.8	258.8	102.	37.6	37.2	14.	7.6	5.8	1.8	.048	.272	.176	.096	.9	.58	.32	.008	1.76
7750	" 20	" 21	d	c	.05	308.8	270.8	38.	35.6	35.2	13.	8.	6.5	1.5	.032	.256	.192	.064	.42	.356	.064	.013	1.48
7769	" 25	" 26	d	c	.03	360.8	267.6	93.2	31.2	28.4	13.	8.1	6.7	1.4	.048	.272	.24	.032	.596	.58	.016	.007	1.04
7813	July 2	July 3	d	c	.03	384.8	255.2	129.6	42.8	29.2	14.	8.2	6.4	1.8	.04	.24	.176	.064	.564	.436	.128	.019	1.

Chemical Examination of Water from the Illinois River at Grafton.—Continued.
(Parts per 1,000,000.)

Serial Number.	1900 Date of Collection.	1900 Date of Examination.	Appearance. Turbidity.	Appearance. Sediment.	Appearance. Color.	Residue on Evaporation. Total.	Residue on Evaporation. Dissolved.	Residue on Evaporation. Suspended.	Residue on Evaporation. Loss on Ignition. Total.	Residue on Evaporation. Loss on Ignition. Dissolved.	Chlorine.	Oxygen Consumed. Total.	Oxygen Consumed. By Dissolved.	Oxygen Consumed. By Suspended Matt'r	Nitrogen as Ammonia. Free Ammonia.	Nitrogen as Ammonia. Albuminoid Ammonia. Total.	Nitrogen as Ammonia. Albuminoid Ammonia. Dissolved.	Nitrogen as Ammonia. Albuminoid Ammonia. Suspended	Organic Nitrogen. Total.	Organic Nitrogen. Dissolved.	Organic Nitrogen. Suspended	Nitrogen as Nitrites.	Nitrogen as Nitrates.
7848	July 6	July 7	d	m	.02	343.2	253.2	90.	35.6	31.2	15.	7.7	6.9	.8	.072	.208	.176	.032	.612	.372	.24	.13	1.28
7917	" 13	" 14	d	m	.03	306.8	243.6	63.2	26.4	25.6	13.	6.7	6.6	.1	.096	.24	.16	.08	.568	.35	.218	.015	1.32
7986	" 20	" 21	d	l	.02	347.6	210.4	137.2	31.2	29.2	13.	8.9	6.5	2.4	.048	.272	.176	.096	.452	.276	.176	.035	.88
8035	" 27	" 28	d	l	.02	342.4	228.8	113.6	56.	56.	13.	11.9	7.7	4.2	.048	.352	.176	.176	.644	.372	.272	.018	.88
8096	Aug. 6	Aug. 7	d	l	.01	272.	243.8	28.2	44.4	38.	18.	6.7	5.1	1.6	.112	.256	.16	.096	.644	.452	.192	.014	.92
8157	" 13	" 14	d	l	.01	284.8	232.8	52.	40.8	34.8	22.	6.6	4.7	1.9	.08	.304	.176	.128	.74	.428	.312	.016	1.08
8221	" 20	" 21	d	l	.01	328.	198.8	129.2	28.4	18.4	17.	7.3	4.7	2.6	.08	.304	.224	.08	.6	.316	.284	.019	1.12
8295	" 27	" 28	d	l	.03	302.8	175.2	127.6	31.6	15.6	15.	6.7	4.9	1.8	.096	.352	.128	.224	.668	.188	.48	.013	.96
8372	Sept. 5	Sept. 6	d	m	. . .	366.	219.6	146.4	23.2	14.	14.	10.6	4.6	6.	.112	.4	.224	.176	.688	.38	.308	.008	1.2
8454	" 12	" 13	d	c	.03	300.4	242.4	58.	26.	20.8	18.	7.1	5.	2.1	.064	.224	.192	.032	.508	.416	.082	.013	.12
8500	" 19	" 20	d	c	.01	302.8	225.2	77.6	23.6	20.4	15.	7.4	5.4	2.	.112	.336	.192	.234	.6	.448	.152	.025	1.08
8545	" 26	" 27	d	c	.15	288.8	218.	70.8	37.2	22.	14.	8.	6.8	1.2	.16	.352	.208	.144	.536	. . . .	. . . .	.034	.76
8603	Oct. 3	Oct. 4	d	l	.05	271.6	246.4	25.2	27.6	25.2	16.	6.	5.9	.1	.16	.24	.224	.016	.544	.524	.02	.015	.96
8649	" 10	" 11			.2	313.2	230.	83.2	29.6	26.4	16.	10.1	7.3	2.8	.128	.368	.224	.144	.768	.56	.208	.04	1.04
8668	" 15	" 17	d	l	.01	295.2	256.8	38.4	23.6	21.6	25.	6.9	6.4	.5	.376	.256	.24	.016	.64	.432	.208	.045	1.635
8689	" 22	" 23	d	c	.6	281.6	187.2	94.4	46.	40.8	11.	16.9	14.2	2.7	.16	.332	.288	.044	.752	.512	.24	.035	1.285
8711	" 29	" 30	d	l	.02	254.8	234.	20.8	23.2	21.6	17.	7.	6.7	.3	.112	.16	. . . .	. . . .	.576	.384	.192	.036	1.397
8737	Nov. 5	Nov. 6	d	l	.03	266.4	228.4	38.	22.4	16.8	16.	5.6	5.4	.2	.272	.24	.192	.048	.624	.528	.096	.03	1.53
8765	" 12	" 13	d	l	.03	267.6	214.8	52.8	27.2	22.	14.	8.3	7.8	.5	.24	.256	.192	.064	.736	.368	.368	.032	1.248
8786	" 19	" 20	d	l	.1	256.8	247.6	9.2	18.	16.4	19.	5.5	5.3	.2	.24	.304	.256	.048	.656	.592	.064	.024	1.696
8816	" 26	" 27	d	c	.06	282.	243.2	38.8	16.4	14.8	17.	7.3	6.8	.5	.184	.336	.176	.16	.88	.56	.32	.024	1.376
8853	Dec. 3	Dec. 4	d	l	.05	279.6	240.4	39.2	15.2	14.8	13.5	7.2	6.8	.4	.552	.272	.224	.048	.656	.432	.224	.024	1.336
8879	" 10	" 11	d	l	.15	354.8	271.2	83.6	30.8	29.2	10.	7.5	6.7	.8	.368	.288	.144	.144	.608	.352	.256	.025	1.055
8899	" 17	" 18	d	l	.1	334.8	279.6	55.2	28.8	26.8	11.	7.2	5.7	1.5	.32	.256	.16	.096	.752	.512	.24	.022	2.378
8920	" 24	" 25	d	l	.04	473.2	278.4	194.8	26.	22.8	11.	9.5	5.8	3.7	.28	.448	.224	.224	.841	.624	.224	.018	1.862
Average Jan. 4th—June 25th						497.5	230.5	267.	40.5	27.3	10.9	12.4	7.1	5.3	.512	.457	.216	.241	1.122	.528	.494	.023	1.521
Average July 2nd—Dec. 24th						314.2	234.8	79.4	30.	25.1	15.2	8.	6.3	1.6	.173	.297	.196	.101	.648	.432	.216	.028	1.207
Average Jan. 4th—Dec. 24th						404.6	232.6	171.9	35.3	26.2	13.1	10.2	6.7	3.4	.342	.379	.206	.173	.885	.481	.404	.025	1.364

CHEMICAL EXAMINATION OF WATER FROM THE MISSISSIPPI RIVER AT GRAFTON.

(Parts per 1,000,000.)

Serial Number.	1899. Date of Collection.	1899. Date of Examination.	Appearance: Turbidity.	Appearance: Sediment.	Appearance: Color.	Residue on Evaporation: Total.	Residue on Evaporation: Dissolved.	Residue on Evaporation: Suspended.	Residue on Evaporation: Loss on Ignition, Total.	Residue on Evaporation: Loss on Ignition, Dissolved.	Chlorine.	Oxygen Consumed: Total.	Oxygen Consumed: By Dissolved.	Oxygen Consumed: By Suspended Matt'r	Nitrogen as Ammonia: Free Ammonia.	Nitrogen as Ammonia: Albuminoid Ammonia, Total.	Nitrogen as Ammonia: Albuminoid Ammonia, Dissolved.	Nitrogen as Ammonia: Albuminoid Ammonia, Suspended	Organic Nitrogen: Total.	Organic Nitrogen: Dissolved.	Organic Nitrogen: Suspended	Nitrogen as Nitrites.	Nitrogen as Nitrates.
4554	Dec. 31	Jan. 3	d	c	*3	240.	180.	60.	37.2	34.	3.9	14.	9.	5.	.04	.52	.192	.328	.85	.41	.44	.005	.1
4585	Jan. 5	" 9	d	c	.08	226.8	190.8	36.	28.8	24.	5.2	12.3	8.4	3.9	.018	.44	.16	.28	.81	.33	.48	.003	.07
4627	" 18	" 20	d	c	.02	230.	190.8	39.2	40.	28.8	5.	11.	6.2	4.8	.018	.4	.144	.256	.77	.37	.4	.02	.15
4648	" 25	" 28	d	c	.05	216.	196.8	19.2	24.	20.	5.2	9.2	6.5	2.7	.016	.44	.144	.296	.73	.26	.47	.003	.1
4668	Feb. 1	Feb. 3	d	l	.05	236.	214.8	21.2	37.2	28.	7.9	10.3	6.8	3.5	.024	.4	.16	.24	.77	.29	.48	.008	.25
4708	" 15	" 17	d	l	.04	242.8	236.	6.8	32.	28.	5.	8.	6.8	1.2	.03	.368	.16	.208	.74	.3	.44	.004	.15
4736	" 22	" 25	d	l	.07	225.2	203.2	22.	37.2	28.	5.	8.6	7.3	1.3	.01	.384	.176	.208	.74	.22	.52	.001	.1
4771	Mar. 2	Mar. 6	d	v m	.05	470.	134.	336.	40.	28.	3.	19.5	9.3	10.2	.1	.68	.256	.424	1.26	.38	.88	.02	.55
4784	" 8	" 10	d	m	.4	316.8	154.8	162.	46.	30.	3.	19.7	13.5	6.2	.286	.64	.304	.336	1.26	.7	.56	.025	.5
4824	" 15	" 18	d	m	.06	1196.	134.	1062.	92.	32.	3.	34.3	11.2	23.1	.44	1.52	.288	1.232	3.	.62	2.38	.02	.8
4844	" 23	" 25	v d	v m	.15	784.	164.	620.	72.	36.	2.4	25.7	9.5	16.2	.36	.68	.24	.44	2.03	.51	1.52	.035	1.3
4876	" 29	April 1	d	m	.6	352.	124.	228.	46.	34.	3.	22.8	12.8	10.	.48	.72	.32	.4	1.31	.63	.68	.03	.6
4921	Apr. 12	" 14	d	c	.2	658.8	142.8	516.	54.	24.8	3.2	18.8	8.7	10.1	.28	.72	.24	.48	1.63	.47	1.16	.01	.95
4946	" 19	" 21	d	c	.07	474.8	118.8	356.	36.	22.	2.	16.6	8.	8.6	.32	.6	.24	.36	1.31	.4	.91	.04	.55
4973	" 26	" 28	d	c	.3	314.	123.6	190.4	28.	4.6	2.	13.5	7.5	6.	.064	.4	.208	.192	1.17	.41	.76	.048	.5
5004	May 3	May 6	d	m	.3	891.2	130.4	760.8	17.1	6.7	2.	26.9	8.4	18.5	.01	.96	.208	.752	1.85	.49	1.36	.02	.65
5025	" 10	" 13	d	m	.15	348.	127.6	220.4	28.	22.	.69	14.63	10.6	4.03	.036	.416	.256	.16	1.13	.474	.656	.035	.4
5060	" 17	" 19	d	m	.05	287.6	133.6	154.	27.2	16.4	2.4	18.4	13.8	4.6	.06	.448	.256	.192	1.13	.794	.336	.006	.28
5091	" 24	" 26	v d	v m	.3	1097.6	138.8	958.8	50.8	24.4	2.	26.5	13.4	13.1	.184	1.12	.288	.832	2.65	.7	1.95	.05	.16
5136	" 31	June 1	d	m	.3	844.	147.6	696.4	61.6	26.	2.	24.8	10.9	13.9	.052	.832	.192	.64	2.01	.762	1.248	.016	.52
5186	June 7	" 9	d	m	.6	705.2	155.6	549.6	68.4	34.	1.5	25.5	12.1	13.4	.012	.88	.24	.64	2.65	.57	2.08	.007	.6
5221	" 14	" 16	d	m	.6	521.6	181.2	340.4	29.2	21.6	1.5	23.4	13.5	9.9	.044	.672	.256	.416	1.64	.856	.784	.002	.56
5261	" 21	" 23	d	c	.5	403.6	113.2	290.4	32.	19.6	1.5	20.4	13.1	7.3	.028	.512	.256	.256	1.4	.6	.8	.004	.52
5322	" 28	" 30	d	c	.5	395.6	140.4	255.2	24.8	22.	1.	19.3	14.6	4.7	.024	.48	.192	.288	1.08	.52	.56	.002	.48

*The water of the Mississippi is at all times so turbid or muddy that it has been necessary, invariably, to filter before attempting to determine the color.

CHEMICAL EXAMINATION OF WATER FROM THE MISSISSIPPI RIVER AT GRAFTON.—CONTINUED.
(Parts per 1,000,000.)

Serial Number.	1899 Date of Collection.	1899 Date of Examination.	Appearance. Turbidity.	Appearance. Sediment.	Appearance. Color.	Residue on Evaporation. Total.	Residue on Evaporation. Dissolved.	Residue on Evaporation. Suspended.	Residue on Evaporation. Loss on Ignition. Total.	Residue on Evaporation. Loss on Ignition. Dissolved.	Chlorine.	Oxygen Consumed. Total.	Oxygen Consumed. By Dissolved.	Oxygen Consumed. By Suspended Matt'r	Nitrogen as Ammonia. Free Ammonia.	Nitrogen as Ammonia. Albuminoid Ammonia. Total.	Nitrogen as Ammonia. Albuminoid Ammonia. Dissolved.	Nitrogen as Ammonia. Albuminoid Ammonia. Suspended	Organic Nitrogen. Total.	Organic Nitrogen. Dissolved.	Organic Nitrogen. Suspended	Nitrogen as Nitrites.	Nitrogen as Nitrates.
5350	July 5	July 6	d	l	*.15	286.	122.8	163.2	21.2	20.4	1.2	17.7	14.6	3.1	.036	.4	.224	.176	1.	.728	.272	.004	.36
5410	" 12	" 14	d	c	.5	172.4	159.6	12.8	45.6	45.2	1.3	24.6	12.5	12.1	.024	.576	.256	.32	1.4	.664	.736	.002	.6
5454	" 19	" 20	d	c	.3	282.8	161.2	121.6	52.4	42.4	2.2	16.3	13.3	3.	.04	.416	.24	.176	1.	.568	.432	.02	.32
5497	" 26	" 27	d	c	.08	267.6	165.2	102.4	55.2	45.6	2.2	15.2	13.2	2.	.048	.416	.224	.192	.92	.376	.544	.01	.4
5542	Aug. 2	Aug. 3	d	l	.25	224.	158.	66.	46.	36.	2.4	14.9	12.3	2.6	.024	.32	.176	.144	.76	.536	.224	.001	.2
5597	" 9	" 10	d	c	.04	438.	163.6	274.4	55.6	41.2	2.6	15.2	11.1	4.1	.036	.416	.16	.256	1.32	.328	.992	.005	.12
5641	" 16	" 17	d	c	.15	305.2	152.8	152.4	66.4	48.	2.7	13.9	10.4	3.5	.036	.432	.176	.256	1.32	lost	....	.011	.28
5697	" 23	" 24	d	c	.05	265.2	178.	87.2	41.2	34.	3.1	11.2	7.8	3.4	.012	.336	.192	.144	1.	.44	.56	.004	.16
5748	" 30	" 31	d	l	.02	244.4	182.8	61.6	38.8	36.4	3.5	10.9	9.9	1.	.032	.272	.176	.096	.92	.424	.496	.002	.12
5804	Sept. 6	Sept. 7	d	c	.03	246.4	170.8	75.6	31.6	28.8	3.5	10.6	6.	4.6	.036	.32	.16	.16	1.	.44	.56	.05	.2
5851	" 13	" 14	d	c	.04	270.4	156.	114.4	29.2	14.4	2.4	11.8	6.8	5.	.04	.384	.208	.176	.92	.552	.368	.007	.2
5901	" 20	" 21	d	c	.04	265.6	162.8	102.8	35.2	33.6	2.3	13.	8.6	4.4	.016	.432	.144	.288	1.08	.328	.752	.01	.32
5960	" 27	" 28	d	c	.15	234.8	141.6	93.2	32.4	21.6	2.8	13.5	11.9	1.6	.014	.416	.244	.172	.98	.484	.496	.005	.16
6002	Oct. 4	Oct. 5	d	c	.07	206.8	148.8	58.	32.	25.2	2.8	16.6	15.3	1.3	.032	.4	.224	.176	.868	.372	.496	.005	.2
6044	" 11	" 12	d	c	.15	228.	163.6	64.4	27.6	24.8	2.8	13.7	13.6	.1	.016	.416	.208	.208	.74	.404	.336	.003	.2
6165	" 25	" 26	d	c	.05	230.8	154.4	76.4	25.6	15.6	3.6	9.8	8.7	1.1	.02	.416	.18	.236	.76	.296	.464	.005	.12
6204	Nov. 1	Nov. 2	d	c	.04	232.4	162.	70.4	14.8	12.	3.7	8.9	8.6	.3	.028	.384	.16	.224	.68	.36	.32	.006	.16
6256	" 8	" 9	d	c	.08	244.4	173.6	70.8	30.	22.	2.8	10.2	9.2	1.	.028	.32	.24	.08	.84	.44	.4	.005	.24
6305	" 15	" 16	d	c	.03	303.2	169.2	134.	20.8	17.2	2.5	12.5	12.5	0.0	.088	.368	.32	.048	.68	.424	.256	.006	.2
6346	" 22	" 23	d	c	.3	241.2	150.8	90.4	38.8	33.2	3.2	12.7	12.3	.4	.064	.4	.224	.176	.84	.52	.32	.006	.16
6413	" 29	" 30			....	178.8	156.8	22.	37.6	27.2	3.1	12.	11.6	.4	.096	.336	.272	.064	.936	.52	.416	.006	.16
6461	Dec. 6	Dec. 7	d	c	.15	170.8	146.	24.8	28.8	20.8	3.	14.4	13.5	.9	.048	.32	.208	.112	.84	.68	.16	.006	.32
6520	" 13	" 14	d	c	.15	157.2	134.8	22.4	23.6	22.	3.7	12.5	11.8	.7	.001	.352	.224	.128	.744	.52	.224	.005	.12
6560	" 20	" 22	d	c	.10	169.6	147.2	22.4	23.2	19.6	3.6	12.1	11.9	.2	.032	.32	.208	.112	.6	.296	.304	.006	.16
Average Dec. 31, '98—June 28, '99						486.5	157.3	329.2	41.2	24.7	3.2	18.5	10.1	8.4	.122	.634	.224	.41	1.413	.502	.911	.017	.48
Average July 5—Dec. 20						244.4	157.6	86.8	32.4	26.	2.5	11.4	9.6	2.4	.033	.34	.18	.16	.83	.4	.41	.007	.2
Average Dec. 31, '98—Dec. 20, '99						365.4	157.4	208.	36.8	25.4	2.8	15.2	9.8	5.4	.077	.487	.204	.283	1.122	.452	.665	.012	.34

*The water of the Mississippi is at all times so turbid or muddy that it has been necessary, invariably, to filter before attempting to determine the color.

Odor none. Color upon ignition brown.

CHEMICAL EXAMINATION OF WATER FROM THE MISSISSIPPI RIVER AT GRAFTON.
(Parts per 1,000,000.)

Serial Number.	1900. Date of Collection.	1900. Date of Examination.	Appearance. Turbidity.	Appearance. Sediment.	Appearance. Color.	Residue on Evaporation. Total.	Residue on Evaporation. Dissolved.	Residue on Evaporation. Suspended.	Residue on Evaporation. Loss on Ignition. Total.	Residue on Evaporation. Loss on Ignition. Dissolved.	Chlorine.	Oxygen Consumed. Total.	Oxygen Consumed. By Dissolved.	Oxygen Consumed. By Suspended Matt'r	Nitrogen as Ammonia. Free Ammonia.	Nitrogen as Ammonia. Albuminoid Ammonia. Total.	Nitrogen as Ammonia. Albuminoid Ammonia. Dissolved.	Nitrogen as Ammonia. Albuminoid Ammonia. Suspended	Organic Nitrogen. Total.	Organic Nitrogen. Dissolved.	Organic Nitrogen. Suspended	Nitrogen as Nitrites.	Nitrogen as Nitrates.
6625	Jan. 4	Jan. 5	d	c	*.05	232.4	210.8	21.6	23.2	21.2	9.4	13.	9.3	3.7	.08	.352	.208	.144	.76	.328	.432	.007	.16
6656	" 10	" 11	d	c	.1	206.4	192.4	14.	20.	16.8	4.8	11.6	9.3	2.3	.012	.48	.176	.304	.792	.344	.448	.003	.08
6706	" 17	" 18	d	c	.06	204.8	178.8	26.	39.2	26.4	4.4	10.7	8.8	1.9	.024	.352	.176	.176	.88	.384	.496	.001	.08
6750	" 24	" 25	d	m	.06	274.4	180.4	94.	30.4	20.	3.8	11.2	5.2	6.	.028	.352	.176	.176	.8	.512	.288	.008	.48
6801	" 31	Feb. 1	d	c	.25	213.6	172.8	40.8	34.8	22.8	4.	13.3	11.2	2.1	.12	.32	.24	.08	.8	.416	.384	.008	.48
6865	Feb. 7	" 8	d	c	.03	248.4	181.2	67.2	24.4	13.6	5.8	13.2	9.2	4.	.09	.368	.24	.128	.96	.32	.64	.006	.4
6912	" 14	" 15	d	m	.4	531.6	148.8	382.2	38.8	26.	3.65	17.	8.6	8.4	.112	.672	.224	.448	1.52	.416	1.104	.006	.72
6957	" 21	" 23	d	m	.5	318.	137.2	180.8	64.	30.4	3.3	13.5	11.3	2.2	.304	.688	.352	.336	1.36	.864	.496	.012	.72
6999	Mar. 1	Mar. 3	d	m	.08	210.	152.4	57.6	37.2	17.6	3.8	13.7	11.2	2.5	.228	.4	.176	.224	.72	.48	.24	.008	.68
7058	" 9	" 12	d	m	.4	499.6	142.8	356.8	25.6	14.4	3.4	14.8	7.4	7.4	.152	.48	.208	.272	1.44	.512	.928	.007	.64
7115	" 19	" 20	d	m	.5	533.6	125.6	408.	34.2	16.4	2.	22.4	8.8	13.6	.352	.736	.256	.48	1.64	.536	1.104	.008	.52
7172	" 26	" 28	d	m	.3	367.2	108.8	258.4	32.	13.6	2.8	17.1	9.5	7.6	.42	.56	.304	.256	1.48	.696	.784	.01	.48
7214	April 2	April 3	d	m	.05	259.6	125.2	134.4	22.4	13.6	3.4	14.	7.3	6.7	.332	.448	.272	.176	.952	.612	.34	.008	.6
7269	" 9	" 10	v d	v m	.3	1024.	116.8	907.2	46.8	22.8	1.5	27.6	9.3	18.3	.272	1.088	.304	.784	2.52	.76	1.76	.017	1.04
7326	" 16	" 17	d	m	.3	302.4	141.2	161.2	22.	21.2	3.5	14.4	8.2	6.2	.14	.432	.272	.16	1.08	.664	.416	.022	.68
7395	" 23	" 24	v d	vm	.4	1171.6	118.4	1053.2	64.	16.8	2.	21.7	6.6	15.1	.044	1.28	.176	1.104	2.92	.44	2.48	.026	.8
7451	May 2	May 3	d	m	.05	311.6	137.2	174.4	32.8	20.8	3.4	14.9	8.2	6.7	.016	.416	.24	.176	1.14	.484	.656	.011	.6
7499	" 9	" 10	d	c	.3	264.8	102.	162.8	30.4	21.2	3.	17.6	11.9	5.7	.04	.4	.272	.128	1.06	.84	.22	.006	.12
7560	" 16	" 17			.2	326.4	123.6	202.8	41.2	23.2	3.	18.5	9.7	8.8	.056	.448	.176	.272	1.06	.356	.704	.002	.2
7604	" 23	" 24	v d	v m	.2	494.8	147.2	347.6	54.4	24.4	3.	17.4	10.9	6.2	.04	.48	.24	.24	.964	.42	.544	.013	1.
7628	" 30	" 31	d	c	.1	270.4	136.4	134.	39.2	24.8	3.4	12.	8.5	3.5	.012	.352	.192	.16	.96	.452	.508	.008	.48
7673	June 6	June 7	d	c	.05	270.6	136.	141.6	36.	30.8	3.9	13.6	8.2	5.4	.024	.352	.128	.224	.9	.324	.576	.006	.2
7723	" 13	" 14	d	c	.15	239.2	165.2	74.	35.6	28.	4.	9.4	8.1	1.3	.028	.32	.16	.16	.708	.28	.428	.001	.16
7749	" 20	" 21	d	l	.05	257.2	181.6	75.6	38.8	22.8	3.7	11.8	7.5	4.3	.04	.288	.128	.16	.66	.292	.368	.004	.12
7770	" 25	" 26	d	m	.03	562.8	164.	398.8	40.4	22.8	3.4	16.	6.9	9.1	.042	.48	.112	.368	1.156	.452	.704	.013	.28
7812	July 2	July 3	d	m	.05	318.	220.	98.	36.8	34.8	4.	9.9	6.8	3.1	.078	.32	.16	.16	.868	.324	.544	.009	.36
7885	" 9	" 10	d	l	.03	348.4	189.2	159.2	22.	17.2	4.8	12.2	6.9	5.3	.06	.32	.176	.144	1.092	.18	.912	.005	.4

*The water of the Mississippi is at all times so turbid or muddy that it has been necessary, invariably, to filter before attempting to determine the color.

CHEMICAL EXAMINATION OF WATER FROM THE MISSISSIPPI RIVER AT GRAFTON.—CONTINUED.

(Parts per 1,000,000.)

Serial Number.	1900 Date of Collection.	Examination.	Appearance. Turbidity.	Sediment.	Color.	Residue on Evaporation. Total.	Dissolved.	Suspended.	Loss on Ignition. Total.	Dissolved.	Chlorine.	Oxygen Consumed. Total.	By Dissolved.	By Suspended Matt'r	Nitrogen as Ammonia. Free Ammonia.	Albuminoid Ammonia. Total.	Dissolved.	Suspended	Organic Nitrogen. Total.	Dissolved.	Suspended	Nitrogen as Nitrites.	Nitrates.
7927	July 16	July 17	d	l	*.02	280.8	181.2	99.6	20.	17.2	4.2	11.3	6.5	4.8	.08	.336	.176	.16	.9	.308	.592	.008	.36
7994	" 23	" 24	d	m	.02	254.8	138.4	216.4	34.8	20.8	3.3	12.9	6.7	6.2	.074	.336	.192	.144	.68	.212	.468	.001	.36
8048	" 30	" 31	d	m	.02	564.	123.2	440.8	69.2	26.4	2.6	19.	8.	11.	.064	.544	.16	.384	1.224	.388	.836	.004	.68
8097	Aug. 6	Aug. 7	d	c	.01	285.2	142.	143.2	58.4	47.2	2.7	14.7	12.8	1.9	.082	.384	.342	.042	.76	.548	.212	.002	.44
8156	" 13	" 14	d	l	.02	235.2	155.6	79.6	39.6	37.6	3.	15.4	10.	5.4	.08	.32	.24	.08	1.	.43	.57	.004	.28
8220	" 20	" 21	d	l	.01	383.6	148.8	234.8	42.	22.4	3.6	12.7	7.2	5.5	.13	.512	.208	.304	1.	.252	.748	.007	.44
8294	" 27	" 28	d	c	.2	423.2	132.	291.2	38.	20.	3.	16.	7.	9.	.128	.384	.192	.192	1.16	.252	.908	.005	.64
8371	Sept. 5	Sept. 6	d	m	.....	309.6	154.8	154.8	24.4	20.4	2.6	19.3	8.8	10.5	.088	.4	.24	.16	.664	.412	.252	.005	.32
8453	" 12	" 13	d	c	.2	216.2	149.6	66.6	34.	24.8	3.	17.5	11.2	6.3	.09	.464	.192	.272	.616	.464	.152	.002	.24
8501	" 19	" 20	d	c	.04	260.8	148.	112.8	40.	27.6	2.8	15.4	11.8	3.6	.068	.4	.288	.112	.888	.592	.296	.004	.32
8544	" 26	" 27	d	c	.8	306.	144.4	161.6	51.6	31.6	2.2	17.6	11.6	5.9	.162	.432	.24	.192	.792	.656	.136	.002	.36
8604	Oct. 3	Oct. 4	d	c	1.2	372.	153.6	218.4	104.	44.8	1.3	27.6	18.3	9.3	.164	.528	.324	.204	1.28	.624	.656	.002	.44
8650	" 10	" 11	d	c	.6	542.4	150.	392.4	42.4	34.4	2.2	24.4	14.4	10.	.174	.608	.224	.384	1.312	.384	.928	.005	.515
8667	" 15	" 17	d	l	.02	296.8	139.6	157.2	44.4	36.4	1.4	23.2	19.	4.2	.12	.464	.272	.192	1.232	.64	.592	.007	.633
8688	" 22	" 23	d	c	.1	317.2	124.8	192.4	43.6	38.8	1.5	26.	19.6	6.4	.101	.576	.368	.208	1.104	.736	.368	.008	.552
8712	" 29	" 30	d	c	1.4	270.8	129.6	141.2	54.8	40.4	1.4	27.2	23.2	4.	.156	.448	.288	.16	.752	.656	.096	.002	.398
8738	Nov. 5	Nov. 6	d	c	.6	233.2	134.4	98.8	30.	23.6	1.9	20.9	17.1	3.8	.164	.448	.256	.192	.912	.56	.352	.005	.395
8766	" 12	" 13	d	l	.4	319.2	140.4	178.8	37.2	30.	1.9	22.2	13.8	8.4	.13	.448	.224	.224	1.056	.608	.448	.01	.59
8787	" 19	" 20	d	l	1.2	181.2	125.2	56.	31.6	28.8	1.7	22.3	17.9	4.4	.164	.384	.352	.032	.912	.688	.224	.007	.393
8819	" 26	" 27	d	c	.1	209.6	136.8	72.8	20.8	18.8	1.9	19.9	16.7	3.2	.106	.352	.192	.16	.816	.576	.24	.006	.514
8852	Dec. 3	Dec. 4	d	l	.4	180.8	145.2	35.6	15.2	12.4	2.4	14.4	14.2	.2	.088	.288	.272	.016	.608	.496	.112	.008	.552
8878	" 10	" 11	d	l	.3	189.2	171.2	18.	26.8	25.6	2.6	12.5	11.9	.6	.056	.224	.128	.096	.6	.352	.248	.011	.469
8898	" 17	" 18	d	l	.6	179.6	172.4	7.2	21.2	20.8	2.6	12.1	11.6	.5	.042	.176	.112	.064	.624	.448	.176	.004	1.076
8919	" 24	" 25	d	l	.6	207.6	179.2	28.4	22.4	20.8	3.	12.3	10.9	1.4	.124	.256	.144	.112	.512	.32	.192	.023	.597
Average Jan. 4—June 25						383.8	149.1	234.7	36.3	21.2	3.7	15.2	8.8	6.3	.12	.501	.216	.285	1.169	.487	.682	.008	.468
Average July 2—Dec. 24						299.4	151.1	148.6	38.6	27.8	2.6	17.6	12.4	5.2	.106	.398	.229	.169	.898	.465	.433	.006	.474
Average Jan. 4—Dec. 24						340.8	150.1	190.7	37.5	24.6	3.1	16.4	10.6	5.8	.113	.448	.222	.226	1.03	.476	.555	.007	.471

*The water of the Mississippi is at all times so turbid or muddy that it has been necessary, invariably, to filter before attempting to determine the color.

Odor none. Color upon ignition brown.

Chemical Examination of Water from the Mississippi River at Alton.

(Parts per 1,000,000.)

Serial Number.	1897. Date of		Appearance.			Residue on Evaporation.					Chlorine.	Oxygen Consumed.			Nitrogen as Ammonia				Organic Nitrogen.			Nitrogen as	
	Collection.	Examination.	Turbidity.	Sediment.	Color.	Total.	Dissolved.	Suspended.	Loss on Ignition. Total.	Loss on Ignition. Dissolved		Total.	By Dissolved.	By Suspended Matt'r	Free Ammonia.	Albuminoid Ammonia. Total.	Albuminoid Ammonia. Dissolved	Albuminoid Ammonia. Suspended	Total.	Dissolved	Suspended	Nitrites.	Nitrates.
1801	Jan. 5	Jan. 6	v d	m	.6	2805.2	167.2	2638.	30.	10.8	4.5	57.	9.2	47.8	.112	2.4	.24	2.16	4.8	.8	4.	.012	.9
1820	" 12	" 13	d	m	.4	2055.2	250.4	1804.8	34.8	11.2	7.	30.2	7.5	22.7	.232	.96	.32	.64	2.56	.64	1.92	.045	2.3
1840	" 19	" 20	d	m	.25	1521.2	224.	1297.2	20.4	16.	7.	24.9	6.9	18.	.196	1.52	.176	1.344	2.88	.72	2.16	.05	2.
1847	" 26	" 27	d	m	.2	833.2	258.4	574.8	14.2	12.	5.4	20.2	7.3	12.9	.188	.72	.4	.32	1.76	.8	.96	.065	3.
1865	Feb. 1	Feb. 2	d	m	.09	1223.2	282.8	940.4	14.4	10.8	6.2	20.1	6.8	13.3	.176	.8	.4	.4	1.44	.72	.72	.055	3.
1899	" 9	" 10	d	c	.09	394.4	258.8	135.6	12.	12.	5.2	12.2	7.3	4.9	.176	.4	.32	.08	1.44	.8	.64	.035	2.3
1920	" 16	" 17	d	c	.15	460.4	274.4	186.	19.2	10.	8.	11.7	7.2	4.5	.336	.48	.224	.256	1.12	.88	.24	.025	2.3
1932	" 23	" 24	d	c	.3	558.4	259.6	298.8	36.	34.	7.	13.5	6.7	6.8	.352	.56	.44	.12	1.44	.8	.64	.085	1.8
1963	Mar. 2	Mar. 3	v d	m	.13	2141.6	254.4	1887.2	80.4	38.	6.	23.8	5.9	17.9	.336	1.12	.32	.8	2.95	.43	2.52	.08	2.2
1983	" 9	" 10	d	m	.2	1013.2	174.8	838.4	88.8	35.6	2.2	25.1	6.2	18.9	.168	.88	.144	.736	2.35	.51	1.84	.06	1.7
2016	" 16	" 17	d	m	.2	1044.	243.2	800.8	88.8	41.6	5.4	24.6	5.9	18.7	.124	.96	.208	.752	1.71	.51	1.2	.05	2.6
2039	" 23	" 24	v d	m	.02	1639.2	243.6	1395.6	82.	33.6	5.8	24.8	6.7	18.1	.108	.88	.208	.672	2.03	.6	1.43	.075	2.7
2061	" 30	" 31	d	c	.04	402.8	268.4	134.4	41.6	29.2	7.6	11.9	6.1	5.8	.064	.32	.16	.16	.91	.51	.4	.065	3.1
2097	April 6	April 7	v d	c	.1	598.8	210.8	388.	40.4	34.8	3.2	16.3	7.3	9.	.04.	.64	.24	.4	1.07	.6	.47	.065	2.1
2114	" 13	" 14	d	c	.6	292.	217.2	74.8	35.2	28.	4.	11.2	7.5	3.7	.032	.4	.208	.192	.75	.65	.1	.04	2.3
2135	" 20	" 21	d	l	.5	280.4	223.2	57.2	39.6	24.8	3.8	10 3	7.4	2.9	.008	.24	.176	.064	1.23	.67	.56	.015	2.4
2157	" 27	" 28	d	c	.2	260.8	198.8	62.	35.2	31.2	3.	10.5	7.1	3.4	.028	.48	.192	.288	.87	.63	.24	.008	1.3
2187	May 4	May 5	d	c	.05	241.2	192.8	48.4	24.8	24.	3.	12.2	8.2	4.	.056	.64	.272	.368	1.19	.71	.48	.014	1.1
2205	" 11	" 12	d	c	.2	338.	235.6	102.4	29.2	19.6	5.4	11.1	8.9	2.2	.048	.56	.208	.352	1.35	.71	.64	.048	1.2
2234	" 19	" 20	d	c	.2	415.2	262.4	152.8	30.	22.4	5.6	14.	8.7	5.3	.028	.72	.272	.448	1.07	.67	.4	.075	1.2
2261	" 25	" 26	d	c	.3	653.2	263.2	390.	36.8	29.2	6.2	16.	7.8	8.2	.024	.72	.4	.32	1.71	.51	1.2	.09	1.1
2288	June 2	June 3	d	c	.3	388.	258.4	129.6	31.6	28.	6.	15.5	8.	7.5	.016	.56	.48	.08	1.23	.67	.56	.055	1.
2310	" 9	" 10	d	c	.2	361.2	254.4	106.8	26.8	22.4	6.2	13.	2.3	10.7	.016	.64	.4	.24	1.29	.73	.56	.04	1.
2324	" 15	" 16	d	c	.04	378.8	229.6	149.2	24.	22.	5.6	15.5	9.	6.5	.008	.64	.208	.432	1.21	.65	.56	.024	1.
2362	" 22	" 23	d	c	.2	292.	210.4	81.6	26.8	24.	4.8	13.6	8.8	4.8	.012	.48	.32	.16	.73	.57	.16	.16	.7
2398	July 1	July 2	v d	m	...	1132.8	216.	916.8	26.	16.	8.	22.3	9.1	13.2	.016	.88	.4	.48	2.41	1.21	1.2	.035	1.
2417	6	" 7	d	m	...	564.	212.	352.	28.	21.2	5.4	16.5	12.8	3.7	.003	.64	.48	.16	1.71	.68	1.04	.006	1.3

CHEMICAL EXAMINATION OF WATER FROM THE MISSISSIPPI RIVER AT ALTON.—CONTINUED.
(Parts per 1,000,000.)

Serial Number.	1897 Date of		Appearance.			Residue on Evaporation.					Chlorine.	Oxygen Consumed.			Nitrogen as Ammonia				Organic Nitrogen.			Nitrogen as	
									Loss on Ignition.						Free Ammonia.	Albuminoid Ammonia.							
	Collection.	Examination.	Turbidity.	Sediment.	Color.	Total.	Dissolved.	Suspended.	Total.	Dissolved.		Total.	By Dissolved.	By Suspended Matt'r		Total.	Dissolved.	Suspended	Total.	Dissolved.	Suspended	Nitrites.	Nitrates.
2441	July 13	July 14	d	c	.6	806.8	278.	528.8	28.8	20.	8.	20.7	8.5	12.2	.012	.8	.352	.448	1.88	.84	1.04	.023	1.3
2470	“ 20	“ 21	d	c	.4	452.8	209.2	243.6	22.8	18.	8.	15.7	8.2	7.5	.032	.8	.288	.512	1.4	.52	.88	.015	.6
2495	“ 27	“ 28	vd	m	.2	2129.2	146.4	1982.8	60.	14.	2.2	26.4	12.7	13.7	.012	1.36	.224	1.136	2.4	.64	1.86	.03	.4
2526	Aug. 3	Aug. 4	d	c	.4	354.4	181.	173.4	26.4	16.	6.	16.2	13.3	2.9	.01	.36	.256	.104	.84	.68	.16	.01	.9
2543	“ 10	“ 11	d	c	.6	446.	191.2	254.8	18.4	17.2	6.2	18.	14.	4.	.008	.64	.288	.352	1.88	1.	.88	.007	.4
2577	“ 18	“ 19	d	m	.5	741.2	188.8	552.4	37.2	25.6	3.6	26.9	17.	9.9	.02	1.04	.448	.592	1.56	.84	.72	.05	.4
2391	“ 24	“ 25	d	c	.4	260.8	177.2	83.6	28.	24.	3.	17.5	14.9	2.6	.02	.64	.448	.192	.98	.42	.46	.003	.35
2616	“ 31	Sept. 1	d	c	.3	278.	202.4	75.6	26.4	24.4	4.	16.5	14.3	2.2	.036	.4	.32	.08	.82	.58	.24	.004	.25
2653	Sept. 10	“ 11	d	c	.4*.5	223.2	178.	45.2	22.	20.	3.5	14.8	14.4	.4	.026	.36	.32	.04	.82	.74	.08	.006	.1
2672	“ 14	“ 15	d	c	.15	240.	184.	56.	16.	14.	4.2	13.5	11.8	1.7	.014	.36	.24	.12	.74	.46	.28	.011	.9
2703	“ 22	“ 23	d	c	.15	237.2	192.8	44.4	17.2	14.	5.	13.5	10.5	3.	.006	.52	.28	.24	.9	.38	.52	.02	.4
2730	“ 29	“ 30	d	c	.05	234.4	192.8	41.6	18.4	14.8	7.	12.	10.5	1.5	.032	.44	.36	.08	.7	.5	.2	.017	.2
2759	Oct. 5	Oct. 6	d	c	.2	300.	194.8	105.2	28.	16.8	8.	14.9	10.7	4.2	.016	.52	.24	.28	1.1	.5	.6	.04	.2
2787	“ 12	“ 13	d	m	.15	?92.	204.8	287.2	26.	22.	8.	18.5	10.6	7.9	.018	.68	.32	.36	1.42	.3	1.12	.05	.1
2832	“ 20	“ 21	d	c	.2	280.8	208.8	72.	22.8	15.6	10.	12.1	8.3	3.8	.02	.36	.24	.12	.7	.34	.36	.017	.3
2850	“ 27	“ 28	d	c	.15	264.	197.2	66.8	19.2	18.	9.	12.8	8.1	4.7	.006	.4	.24	.16	.86	.5	.36	.006	.3
2885	Nov. 3	Nov. 4	d	c	.06	267.6	210.8	56.8	26.4	23.2	13.	12.	8.3	3.7	.008	.28	.16	.12	.78	.42	.36	.007	.4
2923	“ 9	“ 10	d	c	.15	245.6	193.2	52.4	18.8	16.	11.	11.	7.	4.	.026	.4	.28	.12	.7	.5	.2	.05	.6
2985	“ 23	“ 25	d	c	.07*.15	255.2	214.4	40.8	21.2	18.4	16.	12.9	8.	4.9	.012	.36	.28	.08	.78	.42	.36	.015	.5
3007	“ 30	Dec. 1	d	c	.15*.3	236.8	212.4	24.4	25.6	24.8	13.	10.6	8.4	2.2	.006	.44	.28	.16	.53	.41	.12	.03	.6
3048	Dec. 10	“ 11	d	c	.08	306.4	233.2	73.2	22.	19.2	19.	9.7	8.	1.7	.324	.48	.36	.12	.93	.77	.16	.01	.6
3074	“ 17	“ 20	d	c	.06	256.4	232.4	24.	24.	20.	15.	8.9	7.5	1.4	.34	.4	.22	.18	.93	.41	.52	.015	.8
3081	“ 21	“ 22	d	l	.1*.2	261.2	240.8	20.4	19.2	16.8	15.	8.2	7.2	1.	.316	.44	.28	.16	.81	.45	.36	.01	.6
Average Jan. 5—June 22..........						823.6	236.6	586.9	36.9	24.2	5.3	18.3	7.2	11.1	.115	.74	.277	.471	1.64	.65	.98	.053	1.8
Average July 1—Dec. 21						450.7	203.7	247.	25.1	18.8	8.5	15.2	10.5	4.7	.053	.56	.305	.254	1.11	.58	.53	.019	.5
Average Jan. 5—Dec. 21..........						637.1	220.1	416.9	31.4	21.5	6.8	16.8	8.8	7.9	.084	.65	.291	.362	1.77	.62	.75	.036	1.

During the years 1897 and 1898 the samples of water came from the Alton City Supply, which was drawn from the river immediately beside the Illinois shore.

*Not Filtered.

CHEMICAL EXAMINATION OF WATER FROM THE MISSISSIPPI RIVER AT ALTON.
(Parts per 1,000,000.)

Serial Number.	1898 Date of		Appearance.			Residue on Evaporation.					Chlorine.	Oxygen Consumed.			Nitrogen as Ammonia				Organic Nitrogen.			Nitrogen as	
									Loss on Ignition.							Albuminoid Ammonia.							
	Collec-tion.	Exami-nation.	Turbidity.	Sediment.	Color.	Total.	Dissolved.	Suspended.	Total.	Dis-solved.		Total.	By Dis-solved.	By Suspended Matt'r	Free Ammonia.	Total.	Dis-solved.	Sus-pended	Total.	Dissolved.	Suspended	Nitrites.	Nitrates.
3129	Jan. 3	Jan. 5	d	c	.06*.25	273.2	252.4	20.8	32.	15.6	17.	11.	6.7	4.3	.6	.52	.36	.16	.93	.65	.28	.02	.65
3138	" 6	" 7	d	c	.1	328.8	241.2	87.6	30.4	19.2	14.	9.3	6.2	3.1	.44	.68	.36	.32	1.25	.45	.8	.07	.5
3165	" 13	" 14	v d	vm	.04	1965.2	168.	1797.2	73.2	24.	10.	28.	8.1	19.9	.6	1.68	.32	1.36	3.48	.48	3.	.1	.48
3183	" 19	" 20	d	m	.15	591.2	203.2	388.	43.2	19.2	12.	26.	7.3	18.7	1.8	.88	.32	.56	1.8	.52	1.28	.045	.3
3226	Feb. 1	Feb. 2	d	c	.2	440.	239.2	200.8	28.	15.6	11.	15.7	7.4	8.3	.92	.56	.24	.32	1.32	.56	.76	.06	1.5
3259	" 10	" 11	d	c	.05	433.2	249.2	184.	32.	28.	8.	13.7	8.	5.7	.6	.44	.24	.2	1.	.52	.48	.11	2.4
3275	" 15	" 16	d	m	.05	675.6	224.	451.6	34.8	26.	7.	18.1	6.3	11.8	.56	.8	.4	.4	1.4	.68	.72	.055	1.9
3299	" 22	" 23	v d	vm	.4	940.	189.6	750.4	38.	21.6	4.6	26.2	6.6	19.6	.4	1.36	.32	1.04	2.52	.64	1.88	.04	1.75
3319	Mar. 1	Mar. 2	d	c	.1	542.8	227.6	315.2	28.8	21.2	7.	17.5	6.8	10.7	.314	.68	.28	.4	1.16	.48	.68	.025	2.25
3344	" 8	" 9	d	c	.2	433.6	234.4	199.2	46.8	26.	7.	11.7	6.7	5.	.24	.48	.28	.2	.84	.52	.32	.04	1.
3366	" 16	" 18	d	m	.15	624.4	228.	396.4	44.8	37.6	4.4	19.	8.3	10.7	.2	.88	.3	.58	1.72	.76	.96	.002	1.2
3388	" 23	" 24	v d	vm	.15	3102.4	193.6	2908.8	107.2	24.	3.6	45.6	8.5	37.1	.112	1.84	.28	1.56	4.6	.48	4.12	.03	.85
3410	" 30	" 31	v d	vm	.3	2142.	175.6	1966.4	61.2	18.4	3.2	27.1	6.8	20.3	.072	1.48	.28	1.2	3.75	.45	3.3	.032	1.05
3435	April 5	April 6	v d	vm	.3	2060.	154.4	1915.6	78.	17.6	2.8	28.	8.2	19.8	.02	1.56	.36	1.2	3.17	.53	2.64	.023	1.2
3455	" 13	" 14	v d	c	.1	888.8	189.2	699.6	32.8	20.	3.2	18.	14.	4.	.008	.72	.36	.36	1.65	.69	.96	.035	.84
3479	" 20	" 21	d	c	.25	737.2	202.	535.2	40.	24.	3.6	15.5	8.	7.5	.056	.64	.28	.36	1.25	.57	.68	.02	.9
3503	" 26	" 27	d	c	.1	436.	214.8	221.2	37.6	24.8	4.	14.	7.7	6.3	.008	.56	.28	.28	1.01	.6	.41	.023	.85
3537	May 3	May 4	d	m	.06	572.4	227.6	344.8	28.	26.8	6.	13.7	7.8	5.9	.024	.6	.24	.36	1.14	.62	.52	.025	1.
3554	" 10	" 11	d	c	.3	475.6	232.	243.6	38.4	32.4	6.	13.7	7.	6.7	.004	.52	.4	.12	.98	.5	.48	.025	.5
3586	" 17	" 18	d	m	.04	960.	203.2	756.8	36.	32.8	5.6	16.8	6.7	10.1	.004	.8	.36	.44	1.86	.78	1.08	.02	.55
3615	" 24	" 25	d	c	.09	550.	196.	354.	38.	27.6	3.6	15.8	7.5	8.3	.01	.64	.36	.28	1.38	.66	.72	.03	.5
3640	June 1	June 2	d	m	.04	987.2	192.8	794.4	44.	30.8	4.	19.2	6.5	12.7	.004	.96	.28	.68	2.1	.54	1.56	.048	.4
3669	" 8	" 9	d	m	...	556.8	258.	298.8	44.8	42.4	4.8	14.1	6.8	7.3	.009	.48	.16	.32	1.08	.52	.56	.04	.4
3688	" 14	" 15	d	c	...	518.4	224.	294.	32.	12.	5.	14.1	6.6	7.5	.004	.36	.2	.16	1.04	.52	.52	.05	.4
3715	" 21	" 22	d	m	...	470.4	237.6	232.8	30.4	27.2	8.	11.7	6.8	4.9	.009	.44	.2	.24	1.08	.56	.52	.012	.8
3758	" 28	" 29	d	c	.05	594.	239.6	254.4	22.	21.2	7.	14.	6.8	7.2	.001	.4	.24	.16	1.24	.88	.36	.012	.2
3776	July 5	July 6	d	c	...	332.8	249.6	83.2	20.8	20.	7.8	10.4	7.7	2.7	.001	.3	.24	.06	.76	.64	.12	.001	.25

*Not Filtered.

CHEMICAL EXAMINATION OF WATER FROM THE MISSISSIPPI RIVER AT ALTON.—CONTINUED.
(Parts per 1,000,000)

Serial Number.	1898 Date of		Appearance.			Residue on Evaporation.					Chlorine.	Oxygen Consumed.			Nitrogen as Ammonia				Organic Nitrogen.			Nitrogen as	
									Loss on Ignition.							Albuminoid Ammonia.							
	Collec-tion.	Exami-nation.	Turbidity.	Sediment.	Color.	Total.	Dissolved.	Suspended.	Total.	Dis-solved.		Total.	By Dis-solved.	By Suspen ded Matt'r	Free Ammonia.	Total.	Dis-solved.	Sus-pended	Total.	Dissolved.	Suspended	Nitrites.	Nitrates.
3818	July 12	July 13	d	c	.05*.25	356.	250.	106.	20.4	16.	9.	8.7	...	...	.003	.32	.24	.08	.8	.56	.24	.004	.3
3841	" 19	" 20	d	l	.04*.3	256.4	214.	42.4	17.2	16.	7.	9.5	8.2	1.3	.06	.32	.28	.04	.56	.48	.08	.002	.1
3881	" 26	" 27	d	c	.1	260.4	182.4	78.	16.	16.	5.	11.4	8.6	2.8	.004	.32	.22	.1	.64	.48	.16	.002	.2
3910	Aug. 2	Aug. 3	d	c	.1	240.4	186.	54.4	15.2	13.2	5.6	9.5	9.	.5	.002	.36	.3	.06	.56	.32	.24	.004	.25
3936	" 9	" 10	d	l	.05*.3	220.	195.2	248.	26.8	22.8	5.2	9.7	8.	1.7	.002	.32	.28	.04	.56	.4	.16	.004	.1
3961	" 16	" 17	d	c	.04	271.2	240.8	30.4	28.8	26.	10.2	8.6	7.6	1.	.005	.32	.24	.08	.56	.4	.16	.012	.2
3990	" 23	" 24	d	c	.05	314.4	179.6	134.8	29.2	23.6	6.6	10.	5.1	4.9	.004	.44	.24	.2	.64	.36	.28	.02	.35
4017	" 30	" 31	d	c	.05	328.8	209.6	119.6	29.6	26.	12.3	10.	6.8	3.2	.006	.4	.32	.08	.8	.44	.36	.006	.15
4042	Sept. 6	Sept. 7	d	c	.03	360.8	212.	148.8	30.8	26.	12.4	11.6	7.	4.6	.004	.44	.24	.2	1.04	.4	.64	.01	.2
4076	" 13	" 14	d	c	.06	341.2	168.4	172.8	32.4	25.2	8.	10.2	6.	4.2	.006	.32	.2	.12	.72	.36	.36	.007	.1
4096	" 20	" 21	d	c	.04	263.2	215.6	47.6	19.2	18.8	13.	7.5	5.3	2.2	.004	.28	.24	.04	.56	.48	.08	.007	.25
4128	" 27	" 28	d	c	.03	380.8	215.2	165.6	44.8	38.	11.3	10.2	5.4	4.8	.004	.4	.24	.16	.8	.36	.44	.017	.45
4163	Oct. 4	Oct. 5	d	c	.03	304.	222.8	81.2	24.	20.8	14.	7.7	5.6	2.1	.006	.32	.16	.16	.64	.4	.24	.035	.35
4200	" 11	" 12	d	c	.04	302.4	225.2	77.6	22.8	22.	13.	7.5	5.4	2.1	.004	.28	.2	.08	.61	.37	.24	.003	.5
4226	" 18	" 19	d	c	.03	364.	224.8	139.2	30.	22.8	10.	7.5	5.7	1.8	.012	.32	.176	.144	.69	.41	.28	.007	.3
4265	" 26	" 27	d	c	.1	338.	228.	110.	24.8	24.	11.	8.9	5.8	3.1	.04	.32	.176	.144	.73	.45	.28	.015	.5
4301	Nov. 1	Nov. 2	d	c	.05	290.8	244.	46.8	28.	24.	15.	8.4	6.	2.4	.222	.32	.24	.08	.69	.43	.26	.035	.4
4367	" 15	" 17	d	c	.04	346.	240.4	105.6	26.	20.	8.6	8.7	6.	2.7	.08	.36	.24	.12	.71	.47	.24	.028	.7
4403	" 23	" 24	d	c	.04	381.2	266.8	114.4	33.2	30.8	11.	8.1	6.6	1.5	.12	.28	.16	.12	.79	.43	.36	.035	.7
4459	Dec. 6	Dec. 8	d	c	.03	321.6	288.	33.6	36.8	25.2	10.	6.7	5.4	1.3	.068	.24	.176	.064	.57	.37	.2	.007	.2
4482	" 12	" 15	d	c	.04	390.8	308.8	82.	43.6	40.	12.	8.	6.	2.	.072	.336	.224	.112	.69	.37	.32	.01	.15
4508	" 20	" 22	d	c	.04	336.8	294.4	42.4	54.	49.2	11.	8.5	6.	2.5	.158	.352	.192	.16	.93	.41	.52	.012	.35
4532	" 27	" 28	d	c	.15	332.8	262.8	70.	44.	40.	9.	9.5	7.2	2.3	.224	.368	.208	.16	.93	.57	.36	.037	.2
Average Jan. 3—June 28						837.6	215.8	641.7	42.4	24.4	6.6	14.5	7.7	6.8	.269	.805	.296	.619	1.72	.58	1.13	.038	.93
Average July 5—Dec. 27						316.8	234.3	82.5	29.1	25.2	9.9	9.	6.5	.4	.046	.324	.226	.108	.71	.43	.27	.013	.32
Average Jan. 3—Dec. 27						598.1	224.4	373.4	35.9	24.8	8.2	11.9	7.1	4.7	.182	.479	.262	.216	1.23	.51	.72	.026	.66

* Not Filtered.

CHEMICAL EXAMINATION OF WATER FROM THE MISSISSIPPI RIVER AT ALTON.—100 ft. off Illinois shore.
(Parts per 1,000,000.)

Serial Number.	1899. Date of Collection.	1899. Date of Examination.	Appearance. Turbidity.	Appearance. Sediment.	Appearance. Color.	Residue on Evaporation. Total.	Residue on Evaporation. Dissolved.	Residue on Evaporation. Suspended.	Residue on Evaporation. Loss on Ignition. Total.	Residue on Evaporation. Loss on Ignition. Dis-solved.	Chlorine.	Oxygen Consumed. Total.	Oxygen Consumed. By Dis-solved.	Oxygen Consumed. By Suspended Matt'r	Nitrogen as Ammonia. Free Ammonia.	Nitrogen as Ammonia. Albuminoid Ammonia. Total.	Nitrogen as Ammonia. Albuminoid Ammonia. Dis-solved.	Nitrogen as Ammonia. Albuminoid Ammonia. Sus-pended	Organic Nitrogen. Total.	Organic Nitrogen. Dissolved.	Organic Nitrogen. Suspended	Nitrogen as Nitrites.	Nitrogen as Nitrates.
4580	Jan. 5	Jan. 6	d	c	.05	336.	258.	78.	38.	35.2	10.9	12.1	8.2	3.9	.778	.44	.224	.216	.97	.53	.44	.014	.3
4601	“ 12	“ 13	d	c	.5	336.8	258.8	78.	52.	40.	9.5	12.5	8.5	4.	.68	.52	.272	.248	1.09	.69	.4	.013	.25
4631	“ 19	“ 20	d	c	.2	358.8	244.	114.8	44.	40.	9.	12.7	7.2	5.5	.6	.44	.224	.216	1.09	.49	.6	.033	.5
4650	“ 27	“ 28	d	c	.04	394.8	240.8	154.	32.	28.	8.3	12.8	7.7	5.1	.48	.48	.176	.304	.97	.49	.48	.045	.25
4670	Feb. 2	Feb. 3	d	c	.03	297.	25?.8	46.2	44.	42.	7.6	11.	7.5	3.5	.44	.36	.208	.152	.69	.45	.24	.065	.75
4688	“ 10	“ 11	d	c	.06	364.	319.2	44.8	50.	40.	10.	9.8	7.5	2.3	.6	.48	.24	.24	1.02	.58	.44	.013	1.25
4719	“ 17	“ 18	d	m	.05	610.	300.8	309.2	54.	40.8	9.7	18.5	6.6	11.9	.48	.88	.224	.656	1.82	.58	1.24	.017	1.1
4743	“ 24	“ 27	d	c	.06	310.8	294.	16.8	56.	50.	10.7	10.3	6.6	3.7	.56	.4	.277	.128	.74	.46	.28	.021	.95
4761	Mar. 2	Mar. 3	v d	v m	...	1064.8	126.	938.8	76.	30.	2.1	34.	12.1	21.9	.24	1.28	.288	.992	2.74	.66	2.08	.05	.6
4796	“ 10	“ 13	v d	v m	.3	944.	152.	792.	76.	40.	5.1	26.5	9.8	16.7	.44	1.	.288	.712	2.5	.62	1.88	.036	1.
4823	“ 16	“ 17	v d	v m	.3	1154.8	142.	1012.8	90.8	32.	4.8	36.	11.2	24.8	.44	1.44	.272	1.168	2.66	.7	1.96	.022	1.
4850	“ 24	“ 25	v d	v m	.1	780.	176.	604.	72.	40.	4.4	24.9	11.	13.9	.44	.64	.256	.384	1.79	.48	1.31	.027	1.2
4874	“ 30	“ 31	d	m	.25	431.2	190.	241.2	46.	40.	5.	15.7	9.	6.7	.32	.48	.224	.256	1.	.55	.45	.045	1.6
4903	April 7	April 8	d	c	.1	350.	202.	148.	44.	40.	5.2	13.	8.4	4.6	.32	.48	.256	.224	.83	.6	.23	.035	1.2
4927	“ 14	“ 17	d	m	.04	448.	222.	226.	48.	44.	5.7	14.1	8.3	5.8	.176	.48	.256	.224	.99	.47	.52	.084	1.8
4947	“ 20	“ 21	d	c	.05	415.6	213.6	202.	48.	33.2	5.4	13.	7.6	5.4	.24	.44	.208	.232	1.07	.47	.6	.07	1.55
4966	“ 27	“ 28	d	c	.08	298.4	200.	98.4	36.	30.8	5.3	12.	7.2	4.3	.032	.52	.224	.296	.97	.61	.36	.04	.9
5000	May 3	May 4	d	m	.1	590.8	191.2	399.6	46.	33.2	4.5	17.2	9.1	8.1	.022	.76	.288	.472	1.61	.49	1.12	.042	.6
5018	“ 10	“ 11	d	c	.25	483.6	205.6	278.	44.6	18.4	4.87	15.	8.4	6.6	.06	.512	.256	.256	1.21	.742	.468	.04	.6
5057	“ 18	“ 19	d	m	.2	509.6	229.2	280.4	34.8	26.4	5.4	19.5	12.1	7.4	.068	.512	.288	.224	1.53	.794	.736	.015	.56
5086	“ 24	“ 25	d	m	.08	720.	182.8	537.2	38.8	32.8	3.7	24.	12.7	11.3	.12	.88	.24	.64	1.85	.57	1.28	.006	.84
5126	“ 31	June 1	d	m	.5	884.8	170.4	714.4	45.6	26.8	3.6	20.	8.9	11.1	.044	.8	.224	.576	2.09	.506	1.584	.033	.72
5180	June 8	“ 9	d	m	.3	680.8	193.6	487.2	42.	28.8	3.8	19.8	10.3	9.5	.008	.48	.24	.24	1.85	.73	1.12	.006	1.2
5217	“ 15	“ 16	d	m	.25	475.2	238.8	236.4	30.4	26.8	6.9	15.5	8.6	6.9	.036	.544	.208	.336	1.24	.696	.544	.005	1.36
5263	“ 22	“ 23	d	m	.3	373.6	216.8	156.8	28.	22.4	5.1	14.9	10.3	4.6	.016	.512	.192	.32	1.08	.664	.416	.008	.84
5304	“ 28	“ 29	d	c	.5	349.6	180.4	169.2	23.2	22.8	3.4	15.7	11.7	4.	.02	.448	.224	.224	1.32	.44	.88	.006	.52
5341	July 5	July 6	d	c	.5	282.8	165.6	117.2	48.8	36.4	3.9	16.8	13.8	3.	.02	.384	.24	.144	1.08	.564	.516	.017	.56

CHEMICAL EXAMINATION OF WATER FROM THE MISSISSIPPI RIVER AT ALTON.—100 ft. off Illinois shore.—CONTINUED.
(Parts per 1,000,000.)

Serial Number.	1899. Date of Collection.	Date of Examination.	Appearance. Turbidity.	Sediment.	Color.	Residue on Evaporation. Total.	Dissolved.	Suspended.	Loss on Ignition. Total.	Loss on Ignition. Dissolved.	Chlorine.	Oxygen Consumed. Total.	By Dissolved.	By Suspended Matt'r	Nitrogen as Ammonia. Free Ammonia.	Albuminoid Ammonia. Total.	Dissolved.	Suspended	Organic Nitrogen. Total.	Dissolved.	Suspended	Nitrogen as Nitrites.	Nitrates.
5396	July 12	July 13	d	c	.4	331.6	188.8	142.8	56.8	48.8	4.3	15.4	12.4	3.	.05	.448	.256	.192	1.24	.504	.736	.02	.48
5448	" 19	" 20	d	c	.1	269.6	189.6	80.	25.6	20.	5.6	13.6	11.6	2.	.032	.448	.288	.16	.92	.536	.384	.025	.44
5499	" 26	" 27	d	c	.15	309.2	226.4	82.8	57.6	42.4	10.8	12.6	11.3	1.3	.04	.352	.272	.08	.92	.568	.352	.022	.72
5550	Aug. 2	Aug. 3	d	c	.3	300.8	238.4	62.4	40.	39.6	17.4	12.4	11.9	.5	.028	.304	.208	.096	.824	.664	.16	.04	.72
5592	" 9	" 10	d	c	.03	614.	224.8	389.4	60.8	39.6	13.	16.	9.7	6.3	.036	.48	.208	.272	1.32	.488	.832	.065	.88
5648	" 16	" 17	d	c	.3	302.8	158.8	144.	64.8	38.	5.75	12.2	9.	3.2	.028	.32	.192	.128	1.16	.408	.752	.05	.6
5698	" 23	" 14	d	c	.05	251.2	192.4	58.8	40.4	36.8	6.5	10.2	7.2	3.	.016	.32	.192	.128	.84	.632	.208	.013	.32
5750	" 30	" 31	d	c	.04	256.8	211.2	45.6	39.2	24.	6.3	10.	8.9	1.1	.052	.32	.192	.128	.84	.424	.416	.013	.32
5806	Sept. 6	Sept. 7	d	c	.04	242.4	189.2	53.2	24.8	17.6	6.	9.6	6.	3.6	.056	.304	.208	.096	.92	.536	.384	.008	.2
5857	" 13	" 14	d	c	.06	260.8	184.8	76.	36.4	32.4	5.8	10.9	6.3	4.6	.024	.384	.232	.152	.84	.408	.432	.008	.36
5907	" 20	" 21	d	c	.04	294.4	206.8	87.6	36.8	30.	9.9	11.	7.	4.	.032	.384	.176	.208	.84	.376	.464	.014	.36
5958	" 27	" 28	d	c	.06	227.2	173.6	53.6	34.	2.8	7.3	11.4	10.2	1.2	.04	.352	.256	.096	.9	.532	.368	.01	.28
6003	Oct. 4	Oct. 5	d	c	.07	221.2	158.8	62.4	36.	22.8	6.6	13.3	12.3	1.	.032	.384	.24	.144	.804	.472	.332	.008	.2
6050	" 11	" 12	d	c	.15	231.2	170.8	60.4	12.	9.2	7.	11.6	11.3	.3	.016	.4	.24	.16	.664	.472	.192	.008	.2
6095	" 18	" 19	d	c	.08	230.	207.2	22.8	12.8	12.	11.4	9.7	9.6	.1	028	.352	.24	.112	.92	.424	.496	.005	.28
6160	" 25	" 26	d	c	.04	234.	179.6	54.4	24.	18.	9.2	9.5	8.1	1.4	.044	.432	.352	.08	.92	.536	.384	.009	.2
6210	Nov. 1	Nov. 2	d	c	.08	276.4	194.4	82.	20.4	10.8	11.2	8.9	8.	.9	.084	.368	.256	.112	.712	.564	.148	.016	.52
6248	" 8	" 9	d	c	.06	279.2	214.8	64.4	24.	17.6	15.3	10.	9.4	.6	.096	.336	.24	.096	.904	.552	.352	.016	.48
6311	" 15	" 16	d	c	.5	244.	184.4	59.6	26.8	25.6	11.7	11.3	9.5	1.8	.064	.56	.288	.272	1.032	.584	.448	.03	.36
6348	" 22	" 23	d	c	.25	272.8	217.2	55.6	23.6	14.8	15.8	11.9	10.8	11.1	.06	.64	.24	.4	1.384	.68	.704	.025	.8
6414	" 29	" 30	d	c	.3	233.6	202.	31.6	19.2	16.4	12.1	10.6	10.2	.4	.398	.352	.208	.144	.968	.584	.384	.02	.72
6451	Dec. 6	Dec. 7	d	c	.04	224.4	207.6	16.8	14.	12.8	11.2	11.8	11.1	.7	.244	.448	.32	.128	.872	.552	.32	.015	.8
6510	" 13	" 14	d	c	.1	224.	206.8	17.2	22.	20.8	11.3	12.	9.9	2.1	.084	.448	.272	.176	1.064	.552	.512	.013	.6
6553	" 20	" 21	d	c	.03	253.6	216.	37.6	32.	24.8	11.7	11.2	9.9	1.3	.1	.48	.224	.256	1.32	.52	.8	.018	.8
Average Jan. 5–June 28						533.3	215.3	318.	47.7	34.	6.1	17.3	9.	8.2	.294	.623	.284	.339	1.412	.585	.826	.034	.9
Average July 5–Dec. 20						275.5	155.6	119.9	33.3	24.9	9.1	11.3	9.8	1.5	.068	.4	.241	.158	.968	.525	.443	.019	.48
Average Jan. 5–Dec. 20						406.8	205.6	201.2	40.6	29.5	7.6	14.4	9.4	4.9	.187	.513	.263	.25	1.194	.552	.641	.026	.69

CHEMICAL EXAMINATION OF WATER FROM THE MISSISSIPPI RIVER AT ALTON.— ¼ distance from Illinois shore.
(Parts per 1,000,000.)

Serial Number.	1899 Date of Collection.	1899 Date of Examination.	Appearance. Turbidity.	Appearance. Sediment.	Appearance. Color.	Residue on Evaporation. Total.	Residue on Evaporation. Dissolved.	Residue on Evaporation. Suspended.	Loss on Ignitions. Total.	Loss on Ignitions. Dissolved.	Chlorine.	Oxygen Consumed. Total.	Oxygen Consumed. By Dissolved.	Oxygen Consumed. By Suspended Matt'r	Nitrogen as Ammonia. Free Ammonia.	Albuminoid Ammonia. Total.	Albuminoid Ammonia. Dissolved.	Albuminoid Ammonia. Suspended	Organic Nitrogen. Total.	Organic Nitrogen. Dissolved.	Organic Nitrogen. Suspended	Nitrogen as Nitrites.	Nitrogen as Nitrates.
4582	Jan. 5	Jan. 6	d	c	.04	287.6	238.	49.6	30.8	28.	9.2	11.8	7.8	4.	.528	.44	.192	.248	.93	.45	.48	.01	.25
4600	" 12	" 13	d	c	.04	326.	250.8	75.2	44.	40.	9.9	12.2	8.8	3.4	.56	.48	.256	.224	.97	.69	.28	.017	.35
4630	" 19	" 20	d	c	.15	340.8	238.8	102.	55.6	42.	9.	13.3	7.2	6.1	.68	.52	.24	.28	1.05	.53	.52	.35	.35
4651	" 27	" 28	d	c	.04	388.	239.2	148.8	34.	28.	8.3	12.6	7.7	4.9	.432	.4	.176	.224	.97	.49	.48	.04	.2
4669	Feb. 2	Feb. 3	d	c	.04	296.	250.	46.	46.	40.	7.6	10.4	7.2	3.2	.48	.36	.224	.136	.69	.49	.2	.05	.55
4689	" 10	" 11	d	c	.08	314.	292.8	21.2	42.	36.	9.8	8.1	7.	1.1	.64	.36	.224	.136	.74	.5	.24	.016	1.2
4718	" 17	" 18	d	l	.05	310.8	291.2	19.6	42.	39.2	9.2	9.5	6.7	2.8	.44	.44	.256	.184	.86	.5	.36	.016	1.2
4744	" 24	" 27	d	c	.05	258.	162.	96.	40.	36.	5.	11.5	6.	5.5	.36	.56	.224	.336	1.14	.5	.64	.008	.6
4762	Mar. 2	Mar. 3	v d	v m	. . .	1034.	98.	936.	70.	24.	2.	33.	12.3	20.7	.216	1.12	.304	.816	2.66	.66	2.	.045	.55
4795	" 10	" 13	d	m	.2	552.	150.	402.	52.	40.	4.6	23.	11.7	11.3	.4	.8	.32	.48	1.86	.66	1.2	.037	.55
4822	" 16	" 17	v d	v m	.3	1204.	122.	1082.	100.	26.	3.9	34.5	12.5	22.	.44	1.64	.304	1.336	3.14	.86	2.28	.02	.9
4849	" 24	" 25	v d	v m	.4	784.	130.	654.	82.	32.	3.	33.9	15.2	18.7	.4	.96	.32	.64	2.83	.6	2.23	.033	.8
4873	" 30	" 31	d	m	.2	412.	154.8	257.2	48.	34.	4.4	17.8	10.5	7.3	.44	.6	.272	.328	1.31	.59	.72	.08	1.
4902	Apr. 7	April 8	d	c	.4	272.	162.	110.	40.	30.	4.2	13.3	8.7	4.6	.384	.48	.24	.24	.95	.59	.36	.018	.6
4928	" 14	" 17	d	m	.05	453.	192.	260.	46.	36.	4.4	15.6	12.5	3.1	.24	.48	.288	.192	1.07	.51	.56	.062	1.15
4948	" 20	" 21	d	c	.1	408.4	150.4	258.	42.	28.	3.	15.7	7.7	8.	.28	.48	.224	.256	1.23	.51	.72	.055	.65
4967	" 27	" 28	d	m	.12	252.	142.	110.	34.	26.	2.6	11.7	7.3	4.4	.056	.44	.208	.232	.73	.33	.4	.038	.55
4999	May 3	May 4	d	m	.04	638.8	154.	484.8	48.	26.8	3.4	18.2	8.5	9.7	.008	.76	.208	.552	1.53	.49	1.04	.032	.5
5017	" 10	" 11	d	c	.1	404.4	134.4	270.	40.4	20.	1.43	18.3	10.4	7.9	.068	.544	.256	.288	1.29	.54	.75	.02	.36
5056	" 18	" 19	d	m	.3	569.6	243.6	326.	36.8	27.6	4.	21.9	13.	8.9	.076	.608	.224	.384	1.69	.646	1.044	.023	.6
5085	" 24	" 25	d	m	.04	847.6	164.	683.6	52.	33.2	2.5	25.9	13.2	1.7	.092	.96	.24	.72	2.17	.6	1.57	.017	.84
5129	" 31	June 1	d	m	.3	948.	224.8	723.2	70.8	62.	3.	21.7	11.5	10.2	.032	.832	.32	.512	2.25	.828	1.424	.032	.72
5181	June 8	" 9	d	m	.6	624.	181.6	442.4	45.6	35.6	1.8	24.5	11.6	12.9	.016	.727	.208	.519	2.01	.57	1.44	.007	.72
5216	" 15	" 16	d	m	.5	470.	196.8	273.2	32.	19.6	3.4	19.2	7.7	11.5	.032	.576	.208	.368	1.72	.728	.992	.002	1.
5264	" 22	" 23	d	c	.5	348.8	168.	180.8	24.	11.2	2.	19.2	13.4	5.8	.02	.524	.24	.284	1.24	.504	.736	.004	.48
5305	" 28	" 29	d	c	.7	338.	154.4	183.6	12.8	12.	1.6	17.4	12.5	4.9	.012	.448	.256	.192	1.16	.472	.688	.003	.44
5342	July 5	July 6	d	c	.6	262.8	144.8	118.	46.4	38.4	1.8	18.2	16.5	1.7	.016	.352	.272	.08	1.08	.664	.416	.005	.4

CHEMICAL EXAMINATION OF WATER FROM THE MISSISSIPPI RIVER AT ALTON.—¼ distance from Illinois shore.—CONTINUED.
(Parts per 1,000,000.)

Serial Number.	1899. Date of Collection.	Date of Examination.	Appearance. Turbidity.	Sediment.	Color.	Residue on Evaporation. Total.	Dissolved.	Suspended.	Loss on Ignition. Total.	Loss on Ignition. Dissolved.	Chlorine.	Oxygen Consumed. Total.	By Dissolved.	By Suspended Matt'r	Nitrogen as Ammonia. Free Ammonia.	Albuminoid Ammonia. Total.	Albuminoid Ammonia. Dissolved.	Albuminoid Ammonia. Suspended	Organic Nitrogen. Total.	Dissolved.	Suspended	Nitrogen as Nitrites.	Nitrates.
5397	July 12	July 13	d	c	.4	443.6	158.	285.6	75.2	50.	2.	21.1	14.6	6.5	.02	.512	.272	.24	1.32	.44	.88	.002	.44
5449	" 19	" 20	d	c	.2	226.8	159.6	67.2	28.	24.	2.6	15.	12.4	2.6	.06	.416	.256	.16	.84	.472	.368	.015	.28
5500	" 26	" 27	d	c	.15	278.8	192.4	86.4	48.4	43.2	5.5	13.9	11.5	2.4	.036	.384	.192	.192	.84	.6	.24.	.01	.48
5549	Aug. 2	Aug. 3	d	c	.3	232.	183.6	48.4	30.	29.6	6.6	13.	12.2	.8	.036	.272	.192	.08	.76	.472	.288	.028	.2
5593	" 9	" 10	d	c	.04	422.4	196.8	225.6	56.8	44.4	8.4	14.	10.2	3.8	.052	.352	.208	.144	1.16	.488	.672	.044	.44
5647	" 16	" 17	d	c	.25	297.6	146.4	151.2	53.2	38.8	3.4	13.1	10.8	2.3	.036	.384	.224	.16	1.24	.456	.784	.023	.62
5699	" 23	" 24	d	c	.06	252.	197.2	54.8	38.8	37.6	5.7	10.3	7.5	2.8	.016	.368	.176	.192	1.	.472	.528	.01	.2
5751	" 30	" 31	d	c	.03	250.	190.4	59.6	31.2	30.8	5.7	10.6	9.3	1.3	.04	.32	.16	.16	.92	.456	.464	.011	.28
5807	Sept. 6	Sept. 7	d	c	.02	240.8	184.4	56.4	20.4	15.2	5.5	9.9	6.2	3.7	.048	.288	.224	.064	1.08	.552	.528	.005	.4
5856	" 13	" 14	d	c	.05	260.	172.4	87.6	26.	15.2	5.5	11.	6.7	4.3	.028	.352	.216	.136	.84	.392	.448	.008	.2
5906	" 20	" 21	d	c	.04	283.2	189.2	94.	29.2	20.	7.7	11.7	7.	4.7	.036	.432	.16	.272	1.16	.504	.656	.012	.28
5957	" 27	" 28	d	c	.07	233.	160.4	72.6	27.6	27.2	5.6	12.3	11.2	1.1	.016	.4	.292	.108	.82	.5	.32	.007	.2
6004	Oct. 4	Oct. 5	d	c	.06	212.4	158.	54.4	26.	25.6	5.2	13.5	12.3	1.2	.04	.448	.24	.208	.964	.472	.492	.008	.16
6049	" 18	" 19	d	c	.08	229.2	174.4	54.8	16.8	12.4	6.8	13.1	11.5	1.6	.02	.4	.224	.176	.74	.472	.268	.007	.36
6094	" 18	" 19	d	c	.08	250.8	185.2	65.6	15.6	12.4	10.	9.7	8.9	.8	.024	.384	.24	.144	1.	.424	.576	.005	.2
6161	" 25	" 26	d	c	.04	243.6	174.	69.6	25.2	20.	8.2	9.7	8.	1.7	.044	.416	.24	.176	.744	.312	.432	.008	.2
6209	Nov. 1	Nov. 2	d	c	.08	268.8	187.6	81.2	34.	9.6	9.5	9.	7.7	1.3	.068	.368	.24	.128	.616	.44	.176	.013	.48
6249	" 8	" 9	d	c	.05	254.	197.6	56.4	31.2	24.	8.6	9.6	8.8	.8	.076	.352	.288	.064	.936	.456	.48	.013	.36
6310	" 15	" 16	d	c	.4	230.	164.8	65.2	26.	25.4	7.8	12.1	10.3	1.8	.104	.48	.272	.208	.84	.584	.256	.022	.36
6349	" 22	" 23	d	c	.3	234.4	178.4	56.	18.8	14.8	10.6	12.1	11.5	.6	.048	.544	.208	.336	.968	.616	.352	.02	.52
6415	" 29	" 30	d	c	.3	223.2	189.6	33.6	27.2	16.8	10.6	10.1	10.	.1	.28	.352	.208	.144	.904	.584	.32	.022	.48
6450	Dec. 6	Dec. 7	d	c	.03	215.6	192.4	23.2	28.	26.	8.7	11.8	11.4	.4	.18	.432	.272	.16	1.064	.616	.448	.014	.44
6512	" 13	" 14	d	c	.15	220.4	172.4	48.	21.6	19.2	9.8	12.9	11.6	1.3	.072	.48	.192	.288	1.032	.552	.48	.008	.56
6554	" 20	" 21	d	c	.03	224.8	190.4	34.4	25.2	20.4	11.3	11.7	10.7	1.	.054	.48	.208	.272	1.08	.488	.592	.015	.16
Average Jan. 5–June 28						434.6	176.3	258.2	46.1	31.2	4.7	18.7	9.9	8.2	.282	.636	.247	.388	1.467	.56	.906	.037	.64
Average July.5–Dec. 20						259.5	178.	81.5	32.2	25.6	6.5	12.3	10.2	2.1	.057	.398	.227	.171	.957	.496	.461	.013	.34
Average Jan. 5–Dec. 20						368.4	177.1	181.2	39.3	28.5	5.8	15.3	10.1	5.2	.171	.519	.237	.282	1.218	.53	.687	.025	.5

CHEMICAL EXAMINATION OF WATER FROM THE MISSISSIPPI RIVER AT ALTON.—Midstream.
(Parts per 1,000,000.)

Serial Number.	1899 Date of Collection.	1899 Date of Examination.	Appearance. Turbidity.	Appearance. Sediment.	Appearance. Color.	Residue on Evaporation. Total.	Residue on Evaporation. Dissolved.	Residue on Evaporation. Suspended.	Residue on Evaporation. Loss on Ignition. Total.	Residue on Evaporation. Loss on Ignition. Dissolved.	Chlorine.	Oxygen Consumed. Total.	Oxygen Consumed. By Dissolved.	Oxygen Consumed. By Suspended Matt'r.	Nitrogen as Ammonia. Free Ammonia.	Nitrogen as Ammonia. Albuminoid Ammonia. Total.	Nitrogen as Ammonia. Albuminoid Ammonia. Dissolved.	Nitrogen as Ammonia. Albuminoid Ammonia. Suspended	Organic Nitrogen. Total.	Organic Nitrogen. Dissolved.	Organic Nitrogen. Suspended	Nitrogen as Nitrites.	Nitrogen as Nitrates.
4578	Jan. 5	Jan. 6	d	c	.04	272.	231.6	40.4	35.2	34.8	8.	12.4	8.1	4.3	.334	.4	.176	.224	.93	.49	.44	.008	.1
4603	" 12	" 13	d	c	.5	309.2	242.8	66.4	40.	36.	8.	11.5	7.9	3.6	.52	.48	.24	.24	.97	.65	.32	.018	.3
4633	" 19	" 20	d	c	.15	366.8	236.8	130.	54.	44.	8.3	13.4	7.3	6.1	.56	.48	.224	.255	1.09	.49	.6	.019	.55
4652	" 27	" 28	d	c	.03	346.	236.8	109.2	32.	28.	7.6	12.5	7.5	5.	.28	.4	.176	.224	1.17	.49	.68	.02	.15
4672	Feb. 2	Feb. 3	d	c	.04	298	237.2	60.8	45.2	38.	7.7	10.2	7.	3.2	.4	.4	.176	.224	.73	.45	.28	.012	.55
4690	" 10	" 11	d	c	.1	382.	308.	74.	52.	46.	9.8	13.	8.	5.	.48	.6	.352	.248	1.26	.62	.64	.017	1.15
4717	" 17	" 18	d	c	.06	452.	298.	154.	70.	50.8	9.	26.	7.5	18.5	.04	1.52	.272	1.248	3.22	.54	2.68	.015	1.
4745	" 24	" 27	d	c	.06	299.2	266.	33.2	46.	40.	9.1	9.6	6.	3.6	.4	.44	.192	.248	.82	.46	.36	.015	.65
4763	Mar. 2	Mar. 3	v d	vm	...	837.2	118.	719.2	64.	28.	2.5	38.	10.5	27.5	.192	.96	.24	.72	1.86	.5	1.36	.04	.5
4794	" 10	" 13	d	m	.6	350.	154.8	195.2	44.	36.	3.9	21.	12.5	8.5	.336	.64	.352	.288	1.14	.66	.48	.015	.65
4821	" 16	" 17	v d	vm	.2	1318.	130.	1188.	100.	26.	3.1	36.3	12.2	24.1	.44	1.76	.32	1.44	3.4	.74	2.66	.02	.65
4848	" 24	" 25	v d	vm	.5	824.8	128.8	696.	80.	36.	2.5	35.5	15.8	19.7	.4	.88	.32	.56	2.91	.79	2.12	.037	.75
4872	" 30	" 31	d	m	.6	338.8	114.4	224.4	44.	29.2	3.5	23.	13.	10.	.48	.68	.336	.344	1.39	.63	.76	.025	.65
4901	April 7	April 8	d	m	.4	344.	144.	200.	36.	32.	3.7	14.5	8.2	6.3	.288	.52	.288	.232	.83	.55	.28	.08	.55
4929	" 14	" 17	d	m	.3	531.2	165.2	366.	48.	34.	3.6	17.6	11.5	6.1	.304	.6	.24	.36	1.23	.55	.68	.052	.55
4949	" 20	" 21	d	c	.3	470.	128.	342.	32.	21.2	1.9	16.7	8.1	8.6	.24	.56	.208	.352	1.23	.51	.72	.05	.45
4968	" 27	" 28	d	c	.13	244.	122.4	121.6	32.	20.	2.	12.	7.2	4.8	.056	.44	.208	.232	.73	.37	.36	.034	.35
4998	May 3	May 4	d	m	.3	7?9.2	136.4	632.8	66.	22.4	1.4	18.4	8.7	9.7	.008	.92	.224	.696	1.85	.45	1.4	.034	.45
5016	" 10	" 11	d	c	.3	474.	157.2	316.8	46.	38.4	1.4	16.8	8.8	8.	.04	.64	.256	.384	1.45	.54	.91	.016	.52
5055	" 18	" 19	d	m	.4	737.2	153.2	584.	46.4	20.8	2.3	24.8	14.4	10.4	.06	.96	.32	.64	1.85	.6	1.25	.023	.48
5084	" 24	" 25	d	m	.06	1172.4	146.8	1025.6	72.8	30.	.74	26.2	12.5	13.7	.068	1.04	.256	.784	2.65	.54	2.11	.017	.92
5128	" 31	June 1	d	m	...	1247.6	165.2	1082.4	78.8	26.	.4	26.	12.6	13.4	.044	1.072	.256	.816	2.41	.474	1.936	.019	.56
5182	June 8	" 9	d	m	.6	769.6	167.2	602.4	54.8	34.1	.3	24.2	12.8	11.4	.016	.8	.208	.592	2.65	.57	2.08	.007	.72
5215	" 15	" 16	d	m	.25	481.6	162.4	319.2	33.2	27.2	1.2	19.7	10.7	9.	.028	.64	.224	.416	1.88	.536	1.344	.002	.52
5265	" 22	" 23	d	c	.4	470.8	158.8	312.	21.6	20.	1.5	21.8	13.6	8.2	.032	.576	.192	.384	1.48	.632	.848	.005	.48
5306	" 28	" 29	d	c	.7	415.2	149.2	266.	18.4	12.8	.9	19.6	12.6	5.	.032	.48	.208	.272	1.24	.16	1.08	.004	.4
5343	July 5	July 6	d	c	.7	302.8	140.	162.8	52.8	33.2	1.3	17.	10.8	6.2	.028	.416	.224	.192	1.08	.568	.512	.006	.36

CHEMICAL EXAMINATION OF WATER FROM THE MISSISSIPPI RIVER AT ALTON.—Midstream.—CONTINUED.
(Parts per 1,000,000.)

Serial Number.	1899 Date of Collection.	Date of Examination.	Appearance. Turbidity.	Appearance. Sediment.	Appearance. Color.	Residue on Evaporation. Total.	Residue on Evaporation. Dissolved.	Residue on Evaporation. Suspended.	Loss on Ignition. Total.	Loss on Ignition. Dissolved.	Chlorine.	Oxygen Consumed. Total.	Oxygen Consumed. By Dissolved.	Oxygen Consumed. By Suspended Matt'r	Nitrogen as Ammonia. Free Ammonia.	Albuminoid Ammonia. Total.	Albuminoid Ammonia. Dissolved.	Albuminoid Ammonia. Suspended	Organic Nitrogen. Total.	Organic Nitrogen. Dissolved.	Organic Nitrogen. Suspended	Nitrogen as Nitrites.	Nitrogen as Nitrates.
5398	July 12	July 13	d	c	.7	554.4	164.8	389.6	74.	48.8	2.1	22.8	14.2	8.6	.072	.576	.224	.352	1.64	.568	1.072	.005	.56
5450	" 19	" 20	d	c	.2	295.6	161.2	134.4	44.8	39.6	2.6	16.	12.4	3.6	.034	.448	.224	.224	.92	.408	.512	.007	.32
5501	" 26	" 27	d	c	.2	298.4	167.2	131.2	53.2	44.8	2.4	15.1	12.2	2.9	.028	.416	.256	.16	1.08	.488	.592	.004	.4
5548	Aug. 2	Aug. 3	d	c	.3	228.	176.2	51.8	54.8	50.4	1.2	13.6	12.	1.6	.024	.288	.176	.112	.728	.568	.16	.008	.12
5594	" 9	" 10	d	c	.03	288.4	167.6	120.8	46.	36.8	3.6	13.1	10.9	2.2	.044	.352	.176	.176	1.08	.408	.672	.01	.44
5646	" 16	" 17	d	c	.3	309.6	140.8	168.8	46.4	40.4	2.8	13.3	10.6	2.7	.024	.384	.176	.208	1.16	.456	.704	.017	.28
5700	" 23	" 24	d	c	...	241.6	160.4	81.2	28.4	24.8	3.7	10.7	8.	2.7	.012	.352	.172	.18	1.	.44	.56	.005	.16
5752	" 30	" 31	d	c	.02	256.4	183.6	72.8	35.6	33.2	4.4	10.8	9.3	1.5	.056	.288	.16	.128	.92	.44	.48	.008	.2
5808	Sept. 6	Sept. 7	d	c	.02	241.2	175.2	66.	20.8	20.4	4.3	9.9	6.	3.9	.04	.288	.144	.144	.76	.392	.368	.003	.2
5855	" 13	" 14	d	c	.04	262.	161.2	100.8	36.8	21.2	3.6	11.3	6.3	5.	.018	.416	.184	.232	.92	.376	.544	.006	.2
5905	" 20	" 21	d	c	.04	272.4	174.8	97.6	28.4	20.	5.7	12.	7.	5.	.016	.32	.144	.176	.92	.472	.448	.009	.28
5956	" 27	" 28	d	c	.08	233.2	149.2	84.	27.2	26.	3.8	13.	11.5	1.5	.034	.432	.244	.188	.9	.532	.368	.004	.16
6005	Oct. 4	Oct. 5	d	c	.06	212.	151.6	60.4	36.4	15.2	4.4	13.7	12.7	1.	.048	.384	.224	.16	1.06	.42	.64	.007	.12
6048	" 11	" 12	d	c	.15	220.8	174.6	46.2	22.8	22.	5.1	12.4	12.1	.3	.02	.432	.176	.256	.74	.404	.336	.007	.16
6093	" 18	" 19	d	c	.1	240.8	174.	66.8	19.2	12.	8.8	11.1	9.2	1.9	.04	.352	.208	.144	.84	.448	.392	.007	.2
6162	" 25	" 26	d	c	.05	228.	166.4	61.6	25.6	13.6	6.3	9.5	8.2	1.3	.024	.4	.224	.176	.84	.36	.48	.008	.2
6208	Nov. 1	Nov. 2	d	c	.1	225.6	184.	41.6	26.	7.2	7.7	9.1	7.3	1.8	.06	.384	.144	.24	.872	.408	.464	.01	.44
6250	" 8	" 9	d	c	.1	256.8	201.6	55.2	29.2	26.8	4.2	12.5	9.9	2.6	.028	.384	.304	.08	.84	.424	.416	.008	.2
6309	" 15	" 16	d	c	.4	222.	147.6	74.4	30.4	26.4	3.2	12.2	11.	1.2	.092	.416	.32	.096	.808	.584	.224	.007	.28
6350	" 22	" 23	d	c	.3	204.8	150.4	54.4	32.4	24.4	5.3	11.8	11.	.8	.044	.448	.224	.224	.808	.488	.32	.007	.28
6416	" 29	" 30	d	c	.25	195.2	176.	19.2	33.6	26.8	7.3	10.5	10.4	.1	.116	.32	.24	.08	.808	.552	.256	.012	.28
6452	Dec. 6	Dec. 7	d	c	.03	205.6	176.	29.6	18.8	18.	6.8	12.5	11.6	.9	.08	.432	.32	.112	.968	.68	.288	.012	.52
6513	" 13	" 14	d	c	.15	193.6	190.	3.6	38.8	37.2	6.6	11.8	9.8	2.	.04	.464	.208	.256	.904	.584	.32	.008	.24
6555	" 20	" 21	d	c	.04	228.8	181.6	47.2	37.2	35.6	7.7	14.6	11.4	3.2	.052	.416	.172	.244	1.	.488	.512	.009	.44
Average Jan. 5—June 28...........						560.9	175.3	385.6	49.7	31.2	3.9	20.	10.1	9.8	.233	.726	.248	.477	1.629	.538	1.091	.023	.561
Average July 5—Dec.20						252.7	167.8	84.8	35.9	28.1	4.6	12.8	10.2	2.5	.043	.392	.21	.181	.939	.478	.461	.007	.28
Average Jan. 5—Dec. 20...........						409.8	173.6	236.2	42.9	29.7	4.3	16.4	10.2	6.2	.275	.562	.23	.332	1.291	.508	.782	.015	.423

CHEMICAL EXAMINATION OF WATER FROM THE MISSISSIPPI RIVER AT ALTON.—¼ distance from Missouri shore.
(Parts per 1,000,000.)

Serial Number.	1899 Date of		Appearance.			Residue on Evaporation.					Chlorine.	Oxygen Consumed.			Nitrogen as Ammonia				Organic Nitrogen.			Nitrogen as	
	Collec-tion.	Exami-nation.	Turbidity.	Sediment.	Color.	Total.	Dissolved.	Suspended.	Loss on Ignition. Total.	Loss on Ignition. Dis-solved.		Total.	By Dis-solved.	By Suspen ded Matt'r	Free Ammonia.	Albuminoid Ammonia. Total.	Albuminoid Ammonia. Dis-solved.	Albuminoid Ammonia. Sus-pended	Total.	Dissolved.	Suspended	Nitrites.	Nitrates.
4581	Jan. 5	Jan. 6	d	c	.04	243.2	202.	41.2	33.2	31.2	6.1	11.8	8.2	3.6	.138	.4	.208	.192	.85	.45	.4	.008	.2
4602	" 12	" 13	d	c	.5	280.	226.8	53.2	40.	36.	7.	11.6	7.7	3.9	.4	.44	.24	.2	.89	.57	.32	.007	.2
4632	" 19	" 20	d	c	.2	286.8	215.2	71.6	48.	40.	6.6	11.5	6.5	5.	.28	.44	.192	.248	.93	.49	.44	.026	.4
4653	" 27	" 28	d	c	.03	264.8	214.8	50.	28.	24.	6.2	11.6	7.1	4.5	.08	.44	.16	.28	1.01	.41	.6	.016	.1
4663	Feb. 2	Feb. 3	d	c	.05	286.	243.2	42.8	47.2	40.	8.2	10.1	6.6	3.5	.36	.44	.192	.148	.69	.49	.2	.015	.2
4691	" 10	" 11	d	c	.06	292.8	270.	22.8	44.	36.	8.3	8.5	7.3	1.2	.44	.4	.256	.144	.86	.54	.32	.013	.75
4716	" 17	" 18	d	m	.05	378.	276.8	101.2	52.	48.	8.6	16.5	8.	8.5	.41	.76	.24	.52	2.04	.5	1.54	.014	.7
4746	" 24	" 27	d	m	.1	444.8	266.	178.8	66.	46.	8.7	18.5	7.8	10.7	.44	1.04	.228	.812	2.34	.5	1.84	.012	.75
4764	Mar. 2	Mar. 3	v d	v m	...	598.8	124.8	474.	52.	30.	2.5	21.5	9.5	12.	.176	.8	.192	.608	1.7	.46	1.24	.03	.45
4793	" 10	" 13	d	m	.4	410.	139.2	270.8	44.	38.	3.6	21.2	12.5	8.7	.32	.72	.368	.352	1.38	.62	.76	.05	.65
4820	" 16	" 17	v d	v m	.4	1508.	128.	1380.	116.	32.	2.9	37.5	12.5	25.	.44	2.2	.32	1.88	3.46	.74	2.72	.03	.9
4847	" 24	" 25	v d	v m	.5	909.2	142.	767.2	94.	35.2	2.3	34.6	16.1	18.5	.44	1.12	.368	.752	3.07	.87	2.2	.023	.8
4871	" 30	" 31	d	m	.5	346.	131.2	214.8	46.	31.2	3.2	19.	12.5	6.5	.44	.68	.352	.328	1.31	.6	.71	.018	.6
4900	Apr. 7	April 8	d	c	.3	366.	146.	220.	36.	32.	3.7	14.	8.2	5.8	.272	.56	.192	.368	.87	.47	.4	.021	.3
4930	" 14	" 17	d	m	.3	620.	158.	462.	60.	36.	3.2	18.6	12.5	6.1	.208	.68	.288	.392	1.63	.51	1.12	.076	1.
4950	" 20	" 21	d	c	.1	558.	122.	436.	44.	26.	2.1	17.5	7.8	9.7	.32	.64	.256	.384	1.47	.43	1.04	.04	.55
4969	" 27	" 28	d	c	.3	344.	138.	206.	34.	26.	2.5	13.5	7.8	5.7	.056	.52	.208	.312	1.01	.33	.68	.05	.5
4997	May 3	May 4	d	m	.3	879.2	133.6	745.6	43.6	26.4	1.4	17.3	8.3	9.	.005	.96	.208	.752	2.09	.49	1.6	.034	.5
5015	" 10	" 11	d	c	.15	614.	162.8	451.2	44.	38.4	.8	19.2	9.8	9.4	.056	.64	.224	.416	1.85	.634	1.216	.012	.44
5054	" 18	" 19	d	m	.4	958.	146.	812.	50.4	13.2	1.8	26.	14.	12.	.044	1.184	.288	.896	2.17	.6	1.57	.016	.56
5083	" 24	" 25	d	m	.6	1285.6	150.	1135.6	84.8	30.8	.54	27.7	13.8	13.9	.084	1.12	.304	.816	2.73	.666	2.064	.01	.96
5127	" 31	June 1	d	m	.5	1262.4	139.2	1123.2	84.4	27.6	.4	18.6	11.4	7.2	.068	1.152	.16	.992	2.73	.442	2.288	.02	.56
5183	June 8	" 9	d	m	.6	947.2	151.6	795.6	64.8	22.4	1.2	22.	11.2	10.8	.008	1.12	.24	.88	2.81	.826	1.984	.008	.72
5214	" 15	" 16	d	m	.4	473.6	141.6	332.	29.6	24.	1.3	19.1	10.8	8.3	.04	.672	.24	.432	1.56	.792	.768	.002	.8
5266	" 22	" 23	d	c	.6	578.4	160.4	418.	36.4	25.6	1.4	23.2	12.8	10.4	.036	.576	.288	.288	1.56	.6	.96	.007	.44
5307	" 28	" 29	d	c	.8	449.2	164.	285.2	18.4	8.8	1.3	18.7	12.7	6.	.024	.512	.208	.304	1.4	.504	.896	.003	.44
5344	July 5	July 6	d	c	.8	356.8	142.8	214.	52.4	36.8	1.9	18.8	14.8	4.	.016	.416	.256	.16	2.12	.728	1.392	.004	.52

Chemical Examination of Water from the Mississippi River at Alton.—¼ distance from Missouri shore.—Continued.
(Parts Per 1,000,000.)

Serial Number.	1899. Date of Collection.	Examination.	Appearance. Turbidity.	Sediment.	Color.	Residue on Evaporation. Total.	Dissolved.	Suspended.	Loss on Ignition. Total.	Dis-solved.	Chlorine.	Oxygen Consumed. Total.	By Dis-solved.	By Suspended Matt'r.	Nitrogen as Ammonia. Free Ammonia.	Albuminoid Ammonia. Total.	Dis-solved.	Sus-pended.	Organic Nitrogen. Total.	Dissolved.	Suspended.	Nitrogen as Nitrites.	Nitrates.
5399	July 12	July 13	d	c	.3	560.4	154.4	406.	83.2	47.2	2.2	23.8	13.2	10.6	.032	.64	.24	.4	1.656	.44	1.216	.004	.6
5451	" 19	" 20	d	c	.3	324.8	166.8	158.	51.6	41.6	2.2	16.1	12.4	3.7	.036	.48	.256	.224	1.16	.504	.656	.006	.36
5502	" 26	" 27	d	c	.2	303.2	192.8	110.4	60.8	30.	2.2	14.9	12.1	2.8	.024	.384	.176	.208	1.	.504	.496	.004	.4
5547	Aug. 2	Aug. 3	d	c	.3	228.4	168.4	60.	55.2	52.4	1.2	13.4	12.	1.2	.2	.256	.192	.064	.76	.504	.256	.002	.12
5595	" 9	" 10	d	c	.04	266.8	163.6	103.2	44.	35.6	3.	13.	11.3	1.7	.036	.288	.176	.112	.84	.376	.464	.003	.4
5645	" 16	" 17	d	c	.25	301.2	134.	167.2	46.	36.8	2.5	13.6	10.2	3.4	.036	.4	.144	.256	1.24	.408	.832	.02	.44
5701	" 23	" 24	d	c	...	233.6	163.2	70.4	38.8	32.4	3.2	11.	8.2	2.8	.016	.368	.204	.164	1.	.344	.656	.003	.2
5753	" 30	" 31	d	c	.03	235.2	179.2	56.	32.4	30.4	3.6	10.5	9.3	1.2	.048	.24	.176	.064	.84	.424	.416	.001	.24
5809	Sept. 6	Sept. 7	d	c	.04	230.	165.6	64.4	33.6	21.2	3.6	9.9	6.2	3.7	.032	.288	.176	.112	.76	.28	.48	.001	.16
5854	" 13	" 14	d	c	.04	252.4	164.8	87.6	36.4	27.6	2.5	11.	6.6	4.4	.028	.384	.172	.212	.92	.456	.464	.005	.2
5904	" 20	" 21	d	c	.03	264.8	161.2	103.6	32.	28.	3.1	12.4	8.3	4.1	.012	.352	.16	.192	1.08	.248	.832	.01	.2
5955	" 27	" 28	d	c	.07	220.	145.2	74.8	28.4	28.	2.8	13.1	12.25	.85	.044	.4	.304	.096	.82	.516	.304	.005	.2
6006	Oct. 4	Oct. 5	d	c	.07	213.6	147.6	66.	26.8	24.4	3.2	13.25	11.2	2.05	.048	.416	.272	.144	.836	.472	.364	.005	.08
6047	" 11	" 12	d	c	.15	210.8	163.6	47.2	22.4	21.2	3.7	14.3	11.	3.3	.02	.448	.192	.256	1.06	.324	.736	.005	.2
6092	" 18	" 19	d	c	.06	228.8	156.4	72.4	21.2	16.8	4.9	11.6	9.7	1.9	.052	.384	.176	.208	1.	.36	.64	.005	.2
6163	" 25	" 26	d	c	.06	205.6	160.	45.6	24.	16.	4.3	9.6	8.6	1.	.016	.384	.208	.176	.584	.36	.224	.006	.12
6207	Nov. 1	Nov. 2	d	c	.08	244.4	174.4	70.	21.2	7.2	4.5	9.2	8.4	.8	.028	.4	.144	.256	.68	.392	.288	.007	.28
6251	" 8	" 9	d	c	.06	233.2	173.6	59.6	31.6	31.2	2.9	12.9	9.3	3.6	.028	.352	.24	.112	.936	.36	.576	.006	.2
6308	" 15	" 16	d	c	.3	225.2	143.2	82.	34.	23.2	2.5	12.5	11.2	1.3	.044	.368	.272	.096	.744	.552	.192	.005	.2
6351	" 22	" 23	d	c	.3	191.6	143.2	48.4	25.2	17.6	3.3	12.8	12.1	.7	.026	.432	.24	.192	.808	.52	.288	.005	.12
6417	" 29	" 30	d	c	.3	182.8	157.	25.8	32.	24.4	3.8	11.4	11.	.4	.02	.32	.182	.138	.68	.424	.256	.008	.12
6453	Dec. 6	Dec. 7	d	c	.03	176.4	161.6	14.8	36.	23.6	2.7	12.3	11.9	.4	.016	.4	.32	.08	.968	.616	.352	.011	.44
6514	" 13	" 14	d	c	.15	172.	155.6	16.4	32.	24.	4.	12.6	11.5	1.1	.028	.336	.24	.096	.84	.456	.384	.006	.12
6556	" 20	" 21	d	c	.04	191.2	162.	29.2	30.	28.4	5.4	11.9	11.4	.5	.032	.336	.176	.16	.92	.456	.464	.007	.16
Average Jan. 5—June 28						599.3	172.8	416.5	51.5	30.9	3.7	18.8	10.1	8.7	.214	.775	.247	.528	1.673	.559	1.114	.021	.54
Average July 5—Dec. 20						250.1	160.	90.1	37.2	28.2	3.3	13.	10.5	2.4	.029	.378	.211	.167	.97	.44	.529	.005	.15
Average Jan. 5—Dec. 20						428.2	166.5	361.6	44.5	29.6	3.5	15.9	10.3	5.6	.124	.582	.229	.352	1.328	.501	.826	.013	.35

CHEMICAL EXAMINATION OF WATER FROM THE MISSISSIPPI RIVER AT ALTON.—100 ft. from Missouri shore.
(Parts Per 1,000,000.)

Serial Number.	1899. Date of Collection	Examination	Appearance. Turbidity.	Sediment.	Color.	Residue on Evaporation. Total.	Dissolved.	Suspended.	Loss on Ignition. Total.	Loss on Ignition. Dissolved.	Chlorine.	Oxygen Consumed. Total.	By Dissolved.	By Suspended Matt'r	Nitrogen as Ammonia. Free Ammonia.	Albuminoid Ammonia. Total.	Dissolved.	Suspended	Organic Nitrogen. Total.	Dissolved.	Suspended	Nitrogen as Nitrites.	Nitrates.
4579	Jan. 5	Jan. 6	d	c	.06	228.	198.8	29.2	32.8	28.	5.4	12.1	8.6	3.5	.052	.44	.208	.232	.85	.53	.32	.005	.05
4604	" 12	" 13	d	c	.4	230.8	200.	30.8	40.	32.	4.8	11.	7.	4.	.042	.44	.176	.264	.81	.41	.4	.004	.15
4634	" 19	" 20	d	c	.15	231.6	198.8	32.8	44.8	32.	5.4	10.3	7.	3.3	.014	.4	.16	.24	.81	.33	.48	.02	.6
4654	" 27	" 28	d	c	.03	264.	210.8	53.2	32.	28.	5.9	12.2	7.1	5.1	.018	.44	.144	.296	.77	.37	.4	.008	.1
4671	Feb. 2	Feb. 3	d	c	.04	280.8	235.2	45.6	44.	34.4	7.8	10.6	6.9	3.7	.208	.4	.208	.192	.77	.53	.24	.017	.4
4692	" 10	" 11	d	c	.07	288.	264.	24.	40.	34.	7.8	8.2	7.2	1.	.408	.4	.24	.16	.9	.54	.36	.01	.85
4715	" 17	" 18	d	c	.05	338.	273.2	64.8	46.	42.	8.1	12.	7.3	4.7	.372	.44	.224	.216	.98	.46	.52	.012	.65
4765	Mar. 2	Mar. 3	v d	v m	...	526.	106.	420.	52.	22.	2.4	21.4	8.	13.4	.12	.8	.192	.608	1.54	.38	1.16	.03	.65
4795	" 10	" 13	d	m	.3	470.	144.	326.	40.	34.	3.6	21.6	12.2	9.4	.288	.8	.336	.464	1.38	.66	.72	.024	.6
4818	" 16	" 17	v d	v m	.5	1400.4	127.2	1277.2	83.2	30.8	2.7	35.7	12.5	23.2	.4	1.84	.352	1.488	3.4	.7	2.7	.017	.9
4846	" 24	" 25	v d	v m	.4	954.	124.	830.	94.	33.2	2.4	34.	15.	19.	.48	1.2	.336	.864	3.15	.79	2.36	.04	.8
4870	" 30	" 31	d	m	.4	352.	132.	220.	48.	30.	3.1	18.5	13.	5.5	.4	.68	.352	.328	1.39	.55	.84	.02	.65
4899	Apr. 7	April 8	d	c	.2	382.8	138.8	244.	40.	28.	3.5	14.8	8.	6.8	.272	.52	.176	.344	1.07	.43	.64	.05	.55
4931	" 14	" 17	d	m	.4	622.	156.	466.	56.	34.	3.4	18.8	11.3	7.5	.192	.68	.272	.408	1.55	.55	1.	.054	.9
4951	" 20	" 21	d	c	.15	556.	126.	430.	36.	20.	1.8	17.9	7.6	10.3	.32	.64	.24	.4	1.47	.47	1.	.045	.6
4970	" 27	" 28	d	c	.4	312.4	134.4	178.	31.2	22.	2.4	13.8	7.3	6.5	.072	.52	.208	.312	1.01	.37	.64	.048	.5
4996	May 3	May 4	d	m	.3	801.2	136.4	664.8	50.8	29.2	1.6	18.5	8.4	10.1	.01	.92	.304	.616	2.03	.41	1.62	.038	.5
5014	" 10	" 11	d	c	.06	697.6	150.	547.6	26.4	24.4	.8	21.3	10.1	11.2	.056	.736	.256	.48	1.85	.666	1.184	.04	.48
5053	" 18	" 19	d	m	.4	862.4	146.8	715.6	38.8	26.8	1.4	26.	13.5	12.5	.096	1.024	.256	.768	2.11	.474	1.636	.014	.52
5082	" 24	" 25	v d	v m	.5	1064.4	147.6	916.8	72.	29.2	.8	27.1	14.1	13.	.1	1.04	.256	.784	2.41	.7	1.71	.021	1.08
5130	" 31	June 1	d	v m	.3	1412.8	153.2	1259.6	93.2	49.6	.36	24.7	11.9	12.8	.032	1.312	.224	1.088	2.73	.73	2.	.021	.56
5184	June 8	" 9	d	m	.7	1006.	170.4	835.6	78.4	35.2	.5	26.1	13.4	12.7	.024	.96	.288	.672	2.65	.826	1.824	.007	.48
5213	" 15	" 16	d	m	.4	462.8	169.2	293.6	24.	20.	1.6	18.4	10.8	7.6	.036	.608	.224	.384	1.8	.76	1.04	.003	.72
5267	" 22	" 23	d	c	.5	500.	168.8	331.2	35.6	32.	1.6	21.4	12.7	8.7	.04	.64	.248	.392	1.64	.632	1.008	.007	.36
5308	" 28	" 29	d	c	.6	433.2	150.4	282.8	37.2	26.4	1.6	19.8	12.	7.8	.02	.552	.208	.344	1.32	.472	.848	.005	.4
5345	July 5	July 6	d	c	.8	412.8	142.8	270.	62.8	34.8	2.	19.	14.6	4.4	.02	.48	.24	.24	2.04	.536	1.504	.004	.36
5400	" 12	" 13	d	c	.6	618.8	161.6	457.2	88.4	46.4	2.3	22.8	13.2	9.6	.032	.544	.24	.304	1.464	.472	.992	.002	.6

CHEMICAL EXAMINATION OF WATER FROM THE MISSISSIPPI RIVER AT ALTON.—100 ft. from Missouri shore.—CONTINUED.
(Parts per 1,000,000.)

Serial Number.	1899. Date of		Appearance.			Residue on Evaporation.					Chlorine.	Oxygen Consumed.			Nitrogen as Ammonia				Organic Nitrogen.			Nitrogen as	
									Loss on Ignition.						Free Ammonia.	Albuminoid Ammonia.							
	Collection.	Examination.	Turbidity.	Sediment.	Color.	Total.	Dissolved.	Suspended.	Total.	Dissolved.		Total.	By Dissolved.	By Suspended Matt'r		Total.	Dissolved.	Suspended	Total.	Dissolved.	Suspended	Nitrites.	Nitrates.
5452	July 19	July 20	d	c	.5	289.2	179.2	110.	53.2	44.4	2.6	15.4	11.6	3.8	.032	.32	.208	.012	.84	.472	.368	.006	.36
5503	" 26	" 27	d	c	.2	287.2	158.8	128.4	51.2	39.6	2.2	14.4	11.5	2.9	.02	.384	.224	.16	.92	.408	.512	.005	.4
5546	Aug. 2	Aug. 3	d	c	.3	229.6	164.8	64.8	54.	45.2	2.6	13.2	11.2	2.	.016	.272	.224	.048	.64	.536	.104	.004	.2
5596	" 9	" 10	d	c	.04	293.6	165.6	128.	64.	38.	3.2	13.4	11.5	1.9	.024	.288	.192	.096	.84	.44	.4	.003	.2
5644	" 16	" 17	d	c	.3	326.	138.8	187.2	63.2	40.8	2.8	13.7	10.5	3.2	.02	.384	.192	.192	1.16	.492	.668	.023	.4
5702	" 23	" 24	d	c	...	217.2	183.2	34.	74.	55.6	3.4	11.	8.2	2.8	.016	.4	.24	.16	1.08	.312	.768	.004	.16
5754	" 30	" 31	d	c	.03	230.8	176.8	54.	40.	38.4	3.4	10.5	9.6	.9	.036	.272	.18	.092	.92	.328	.592	.001	.28
5810	Sept. 6	Sept. 7	d	c	.03	228.8	171.6	57.2	26.4	24.4	3.8	9.5	6.1	3.4	.032	.288	.128	.16	.76	.392	.368	.001	.12
5853	" 13	" 14	d	c	.06	222.4	165.2	57.2	28.4	17.2	2.6	9.6	6.3	3.3	.028	.352	.176	.176	.84	.408	.432	.007	.24
5954	" 27	" 28	d	c	.06	216.4	141.6	74.8	37.2	32.	3.1	12.5	11.8	.7	.012	.4	.264	.136	.82	.5	.32	.003	.12
6007	Oct. 4	Oct. 5	d	c	.07	204.	146.8	57.2	31.2	23.6	3.5	12.4	11.8	.6	.032	.368	.272	.096	.74	.372	.368	.004	.08
6046	" 11	" 12	d	c	.15	214.8	162.8	52.	12.	11.6	3.3	12.9	12.8	.1	.02	.432	.24	.192	.772	.404	.368	.005	.08
6091	" 18	" 19	d	c	.06	213.6	161.2	52.4	19.6	12.4	4.1	11.5	9.7	1.8	.044	.352	.192	.16	.92	.36	.56	.007	.16
6164	" 25	" 26	d	c	.06	209.2	153.6	55.6	19.6	14.8	4.	9.9	8.6	1.3	.02	.4	.208	.192	.76	.376	.384	.005	.16
6206	Nov. 1	Nov. 2	d	c	.07	228.8	179.2	49.6	17.2	12.	4.4	9.	8.2	.8	.028	.352	.192	.16	.648	.392	.256	.007	.2
6252	" 8	" 9	d	c	.06	205.2	162.	43.2	16.	14.4	3.2	12.	9.5	2.5	.04	.432	.192	.24	.904	.424	.48	.007	.2
6307	" 15	" 16	d	c	.5	212.4	145.2	67.2	26.	17.2	2.6	12.1	10.9	1.3	.04	.384	.304	.08	.68	.52	.16	.007	.28
6352	" 22	" 23	d	c	...	186.	144.4	41.6	14.4	11.2	3.4	12.8	12.1	.7	.032	.368	.32	.048	.68	.552	.128	.007	.16
6418	" 29	" 30	d	c	.25	168.8	162.4	6.4	25.6	22.8	3.5	10.8	10.8	0.0	.016	.304	.192	.112	.68	.456	.224	.008	.12
6454	Dec. 6	Dec. 7	d	c	.04	189.6	168.4	21.2	38.4	38.	3.6	12.9	11.9	1.	.02	.384	.32	.064	.808	.712	.096	.006	.48
6515	" 13	" 14	d	c	.02	181.6	150.4	31.2	18.8	16.8	3.4	11.8	10.8	1.	.036	.352	.192	.16	.904	.488	.416	.007	.24
6557	" 20	" 21	d	c	.05	168.	153.2	14.8	31.6	30.4	4.6	14.4	11.5	2.9	.036	.368	.176	.192	1.	.424	.576	.008	.16
Average Jan. 5—June 28						583.1	166.8	416.2	48.2	30.2	3.2	19.1	10.1	8.9	.162	.737	.233	.503	1.615	.549	1.065	.022	.56
Average July 5—Dec. 20						248.1	159.9	88.1	38.	28.3	3.2	12.8	10.6	2.2	.027	.37	.221	.148	.909	.449	.46	.005	.24
Average Jan. 5—Dec. 20						419.	163.5	255.4	32.6	29.3	3.2	15.9	10.3	5.6	.096	.557	.227	.329	1.269	.5	.768	.143	.2

CHEMICAL EXAMINATION OF WATER FROM THE MISSISSIPPI RIVER AT ALTON.—100 ft. from Illinois shore.
(Parts per 1,000,000.)

Serial Number.	1900. Date of Collection.	1900. Date of Examination.	Appearance. Turbidity.	Appearance. Sediment.	Appearance. Color.	Residue on Evaporation. Total.	Residue on Evaporation. Dissolved.	Residue on Evaporation. Suspended.	Residue on Evaporation. Loss on Ignition. Total.	Residue on Evaporation. Loss on Ignition. Dissolved.	Chlorine.	Oxygen Consumed. Total.	Oxygen Consumed. By Dissolved.	Oxygen Consumed. By Suspended Matt'r	Nitrogen as Ammonia. Free Ammonia.	Nitrogen as Ammonia. Albuminoid Ammonia. Total.	Nitrogen as Ammonia. Albuminoid Ammonia. Dissolved.	Nitrogen as Ammonia. Albuminoid Ammonia. Suspended	Organic Nitrogen. Total.	Organic Nitrogen. Dissolved.	Organic Nitrogen. Suspended	Nitrogen as Nitrites.	Nitrogen as Nitrates.
6620	Jan. 4	Jan. 5	d	c	.04	311.6	292.4	19.2	41.2	40.	19.1	11.8	9.6	2.2	1.16	.448	.24	.208	1.02	.616	.404	.035	.92
6657	" 10	" 11	d	c	.06	283.2	216.2	67.	31.6	27.6	11.7	9.5	8.4	1.1	.844	.48	.176	.304	1.08	.472	.608	.014	.92
6698	" 17	" 18	d	c	.04	258.4	252.8	5.6	41.2	40.4	9.3	9.2	8.2	1.	.344	.464	.192	.272	.88	.544	.336	.014	.92
6745	" 24	" 25	d	m	.03	435.6	201.2	234.4	39.6	27.6	6.9	15.1	10.5	4.6	.628	.464	.224	.24	1.2	.544	.656	.036	1.32
6811	Feb. 2	Feb. 3	d	c	.04	316.	258.4	57.6	35.6	34.	12.3	10.4	8.9	1.5	1.228	.368	.208	.16	.8	.544	.256	.010	1.28
6856	" 7	" 8	d	c	.04	302.	239.6	62.4	37.6	35.2	12.3	11.8	7.5	4.3	.992	.368	.176	.192	.8	.48	.32	.015	1.28
6906	" 14	" 15	v d	v m	.2	1483.2	146.	1337.2	80.	20.	4.4	29.7	7.5	22.2	.368	1.44	.288	1.152	3.	.544	2.456	.014	1.12
6950	" 21	" 2?	d	m	.2	1552.4	175.6	1376.8	123.6	16.4	6.2	23.3	7.9	15.4	.608	1.184	.272	.912	2.4	.576	1.824	.018	1.32
7000	Mar. 2	Mar. 3	d	c	.04	392.	198.	194.	38.	24.4	6.5	14.1	9.6	4.5	.448	.432	.224	.208	.88	.64	.24	.018	1.36
7053	" 9	" 10	v d	m	.3	1438.8	139.6	1299.2	35.2	14.	3.7	24.9	5.7	19.2	.384	.896	.208	.688	2.72	.512	2.208	.015	.92
7085	" 14	" 15	v d	v m	.04	1284.4	142.4	1142.	42.	12.8	3.8	23.1	5.8	17.3	.368	.96	.16	.8	2.4	.384	2.016	.009	1.4
7131	" 21	" 22	d	m	.06	878.	135.2	742.8	42.8	15.2	3.6	18.4	6.	12.4	.272	.672	.16	.512	1.88	.536	1.344	.009	1.2
7180	" 28	" 29	d	m	.06	616.	140.8	475.2	37.2	12.8	4.5	14.6	6.8	7.8	.288	.448	.176	.272	1.08	.472	.608	.013	1.48
7233	Apr. 4	April 5	d	c	.15	417.2	146.	271.2	25.2	17.2	4.2	12.	6.3	5.7	.24	.384	.176	.208	.76	.376	.384	.015	1.68
7296	" 12	" 13	d	m	.4	534.	109.6	424.4	26.	21.2	3.3	11.8	7.	4.8	.224	.576	.256	.32	1.06	.388	.672	.031	1.52
7341	" 18	" 19	d	c	.04	374.	185.6	188.4	32.4	24.4	5.3	12.2	6.2	6.	.16	.352	.192	.16	1.08	.536	.544	.03	2.2
7409	" 25	" 26	d	m	.04	340.4	196.4	144.	35.6	28.	5.7	13.6	7.6	6.	.096	.4	.208	.192	1.24	.44	.8	.034	1.72
7453	May 2	May 3	d	c	.03	494.4	224.	270.4	33.2	25.2	7.3	13.7	7.4	6.3	.048	.544	.288	.256	1.348	.484	.854	.02	1.44
7493	" 9	" 10	d	m	.04	606.	205.6	400.4	36.8	20.8	7.7	15.1	7.7	7.4	.088	.528	.256	.272	1.	.58	.42	.025	.8
7542	" 16	" 17	d	c	.05	452.	247.6	204.4	42.8	22.4	8.9	13.9	7.8	6.1	.124	.512	.24	.272	1.316	.292	1.024	.03	.76
7593	" 23	" 24	d	c	.03	516.4	259.6	256.8	52.8	42.4	9.4	14.1	7.8	6.3	.064	.4	.112	.288	.74	.388	.352	.025	.92
7632	" 30	" 31	d	m	.2	284.8	148.	136.8	39.2	34.4	4.	11.9	7.7	4.2	.024	.384	.192	.192	.8	.388	.412	.013	.52
7664	June 6	June 7	d	c	.03	388.8	216.4	172.4	34.	32.4	7.6	12.7	8.1	4.6	.012	.352	.192	.16	.84	.58	.26	.01	.92
7714	" 13	" 14	d	c	.03	728.8	222.4	506.4	46.4	38.8	8.5	15.4	7.1	8.3	.024	.48	.24	.24	1.7	.52	1.18	.013	1.08
7751	" 20	" 21	d	c	.04	339.6	239.6	100.	36.8	35.6	8.	9.8	6.4	3.4	.046	.272	.144	.128	.692	.356	.336	.01	.92
7793	" 27	" 28	d	d	.01	480.4	201.6	278.8	56.	33.2	7.4	13.6	5.4	8.2	.042	.368	.16	.208	1.	.356	.644	.048	.88
7827	July 4	July 5	d	l	.03	357.2	230.	127.2	45.6	33.6	10.	9.	7.	2.	.11	.24	.176	.064	.552	.484	.068	.012	1.04

CHEMICAL EXAMINATION OF WATER FROM THE MISSISSIPPI RIVER AT ALTON.—100 ft. from Illinois shore.—CONTINUED.
(Parts per 1,000,000.)

Serial Number.	1900. Date of Collection.	Date of Examination.	Appearance. Turbidity.	Sediment.	Color.	Residue on Evaporation. Total.	Dissolved.	Suspended.	Loss on Ignition. Total.	Loss on Ignition. Dissolved.	Chlorine.	Oxygen Consumed. Total.	By Dissolved.	By Suspended Matt'r	Nitrogen as Ammonia. Free Ammonia.	Albuminoid Ammonia. Total.	Dissolved.	Suspended	Organic Nitrogen. Total.	Dissolved.	Suspended	Nitrogen as Nitrites.	Nitrates.
7906	July 11	July 12	d	l	.02	318.	214.8	103.2	39.2	30.	9.4	8.3	6.7	1.6	.084	.272	.16	.112	.52	.276	.244	.013	1.08
7976	" 18	" 19	d	l	.02	301.6	198.8	102.8	26.4	16.	9.4	8.5	6.8	1.7	.052	.224	.208	.016	.6	.42	.18	.011	.76
8072	Aug. 1	Aug. 2	d	c	.02	508.4	180.8	327.6	39.2	38.4	8.4	13.8	6.6	7.2	.056	.208	.176	.032	1.	.436	.564	.008	1.08
8120	" 7	" 8	d	c	.02	272.8	189.2	83.6	45.6	40.	10.	11.	7.8	3.2	.11	.448	.208	.24	.92	.436	.484	.01	.52
8190	" 15	" 16	d	l	.02	276.	190.8	85.2	36.	32.	10.6	9.5	6.4	3.1	.096	.32	.288	.032	.76	.54	.22	.008	.52
8266	" 22	" 24	d	c	.05	645.6	155.6	490.	52.	18.8	8.	14.	5.3	8.7	.112	.72	.24	.48	1.08	.588	.492	.008	.96
8323	" 29	" 30	d	c	.02	373.6	178.	195.6	36.	12.4	9.6	11.2	5.5	5.7	.084	.352	.112	.24	.52	.252	.268	.008	.88
8380	Sept. 5	Sept. 6	v d	m	.04	376.	208.4	167.6	38.	18.	10.2	10.4	5.8	4.6	.078	.304	.24	.064	.6	.432	.168	.008	.92
8450	" 12	" 13	d	m	.25	323.6	193.2	130.4	39.6	22.8	9.4	13.5	8.3	5.2	.07	.272	.192	.08	.728	.512	.216	.011	.72
8504	" 19	" 20	d	c	.15	304.8	188.4	116.4	36.4	27.6	8.	12.7	8.2	4.5	.164	.368	.272	.096	1.3	.576	.724	.015	.56
8557	" 26	" 27	d	c	.4	320.	176.8	143.2	43.2	28.4	6.	16.5	11.7	4.8	.136	.48	.32	.16	.92	.64	.28	.015	.56
8611	Oct. 3	Oct. 4	d	c	.1	405.2	160.8	244.4	39.2	28.8	5.4	25.3	16.5	8.8	.196	.448	....	....	1.216	....	....	.008	.6
8669	" 16	" 17	d	c	.2	340.	187.6	152.4	40.4	33.2	6.5	16.8	14.4	2.4	.272	.4	.24	.16	1.12	.768	.352	.034	1.126
8682	" 22	" 23	d	c	.6	372.4	155.2	217.2	38.4	35.2	6.7	21.2	15.8	5.7	.2	.464	.288	.176	1.232	.72	.512	.023	.777
8715	" 29	" 30	d	c	.7	350.8	170.	180.8	49.2	46.4	6.5	23.8	15.3	8.5	.144	.416	.192	.224	1.04	.448	.592	.018	.702
8739	Nov. 5	Nov. 6	d	c	.4	250.	163.2	86.8	30.8	20.4	7.	16.1	13.5	2.6	.202	.384	.304	.08	.72	.576	.144	.017	.783
8767	" 12	" 13	d	c	.5	273.2	171.6	101.6	32.4	29.2	7.7	15.1	10.5	4.6	.2	.32	.304	.016	.896	.592	.304	.019	.821
8789	" 19	" 20	d	l	.7	217.6	159.2	58.4	23.2	22.	7.5	16.4	14.1	2.3	.188	.4	.304	.096	1.04	.656	.384	.013	.787
8820	" 26	" 27	d	l	.4	239.2	184.	55.2	20.8	19.6	9.3	14.9	12.7	2.2	.268	.352	.192	.16	.848	.672	.176	.014	.786
8851	Dec. 3	Dec. 4	d	l	.25	234.4	202.8	31.6	21.2	19.6	8.6	10.5	9.9	.6	.336	.324	.288	.036	.88	.544	.276	.018	1.262
8877	" 10	" 11	d	l	.2	285.6	241.6	44.	28.4	26.4	6.7	9.6	8.8	.8	.216	.224	.144	.08	.592	.384	.208	.021	1.419
8896	" 17	" 18	d	l	.3	263.6	230.4	33.2	26.8	25.2	6.8	10.1	9.	1.1	.174	.272	.16	.112	.912	.684	.228	.013	1.347
8917	" 24	" 25	d	l	.2	268.8	236.8	32.	21.2	.....	7.8	10.5	9.1	1.4	.24	.32	.224	.096	.688	.512	.176	.011	1.269
Average Jan. 4—June27						596.4	197.7	398.7	43.1	26.7	7.3	14.8	7.4	7.3	.346	.545	.206	.339	1.296	.478	.817	.02	1.184
Average July.4—Dec.24						328.2	190.3	137.9	36.3	26.	8.1	13.6	9.8	3.8	.165	.355	.218	.137	.861	.506	.355	.014	.886
Average Jan. 4—Dec24						467.7	194.1	273.	39.4	26.4	7.7	14.2	8.6	5.6	.259	.454	.211	.242	1.088	.493	.594	.017	1.041

CHEMICAL EXAMINATION OF WATER FROM THE MISSISSIPPI RIVER AT ALTON.— 1/4 distance from Illinois shore.
(Parts per 1,000,000.)

Serial Number.	1900. Date of Collection	Examination	Appearance. Turbidity.	Sediment.	Color.	Residue on Evaporation. Total.	Dissolved.	Suspended.	Loss on Ignition. Total.	Loss on Ignition. Dissolved.	Chlorine.	Oxygen Consumed. Total.	By Dissolved.	By Suspended Matt'r	Nitrogen as Ammonia. Free Ammonia.	Albuminoid Ammonia. Total.	Dissolved.	Suspended	Organic Nitrogen. Total.	Dissolved.	Suspended	Nitrogen as Nitrites.	Nitrates.
6621	Jan. 4	Jan. 5	d	c	.04	293.6	284.	9.6	35.6	35.2	18.	11.7	9.9	1.8	1.04	.4	.24	.16	.84	.488	.352	.03	.72
6658	" 10	" 11	d	c	.06	274.4	254.8	19.6	28.4	26.4	10.9	12.4	8.8	3.6	.712	.48	.224	.256	1.08	.472	.608	.014	.72
6699	" 17	" 18	d	c	.03	242.	228.8	13.2	39.6	36.4	8.2	9.5	8.3	1.2	.24	.48	.208	.272	.92	.512	.408	.012	.76
6746	" 24	" 25	d	m	.03	426.4	186.8	239.6	47.2	25.2	6.	14.8	8.8	6.	.38	.448	.16	.288	1.04	.352	.688	.018	1.24
6812	Feb. 2	Feb. 3	d	c	.1	316.	244.	72.	46.4	38.4	11.1	12.5	8.8	3.7	1.02	.416	.224	.192	.96	.48	.48	.018	1.24
6857	" 7	" 8	d	c	.06	314.8	244.4	70.4	28.	24.	12.2	11.5	7.9	3.6	.88	.416	.16	.256	.88	.576	.304	.014	1.2
6905	" 14	" 15	v d	v m	.07	1252.	151.6	1100.4	77.2	22.	4.6	24.3	7.7	16.6	.384	1.44	.272	1.168	2.88	.48	2.4	.015	1.08
6951	" 21	" 22	d	m	.15	1223.2	164.	1059.2	117.6	14.8	5.8	21.7	8.4	13.3	.56	1.056	.272	.784	2.32	.544	1.776	.018	1.22
7001	Mar. 2	Mar. 3	d	c	.06	364.8	191.2	173.6	38.4	20.	6.3	14.1	9.2	4.9	.432	.48	.256	.224	.88	.448	.432	.013	1.32
7054	" 9	" 10	v d	m	.04	1157.2	133.2	1024.	39.2	21.6	4.4	18.8	6.	12.8	.352	.832	.176	.656	2.56	.352	2.208	.012	.88
7086	" 14	" 15	v d	v m	.04	1324.	118.8	1205.2	53.6	8.	2.9	25.8	6.8	19.	.288	.768	.224	.544	2.56	.488	2.112	.006	.68
7132	" 21	" 22	d	m	.2	744.4	119.6	624.8	36.4	16.	3.5	18.3	7.2	11.1	.432	.896	.192	.704	2.04	.664	1.376	.008	1.
7179	" 28	" 29	d	m	.1	470.8	138.	332.8	26.8	18.8	4.	14.3	7.	7.3	.384	.544	.176	.368	1.112	.472	.64	.011	1.12
7236	Apr. 4	Apr. 5	d	c	.2	380.4	142.4	238.	24.8	19.6	3.8	12.8	6.8	6.	.288	.336	.192	.144	.664	.504	.16	.015	1.36
7297	" 12	" 13	d	c	.1	442.4	142.	300.8	32.8	10.	3.8	16.7	7.8	8.9	.224	.576	.224	.352	1.32	.504	.816	.026	1.16
7342	" 18	" 19	d	c	.04	301.6	164.8	136.8	26.	19.6	4.4	12.3	6.5	5.8	.176	.32	.176	.144	1.016	.504	.512	.025	1.66
7410	" 25	" 26	v d	v m	.3	656.	135.6	520.4	52.8	20.4	15.2	22.9	8.6	14.3	.048	.768	.16	.608	1.8	.44	1.36	.03	.84
7454	May 2	May 3	d	c	.04	284.	153.6	130.4	25.2	22.4	3.1	14.8	7.9	6.9	.02	.48	.192	.288	.964	.36	.604	.01	.64
7494	" 9	" 10	d	m	.3	441.6	156.4	285.2	35.6	20.4	5.4	16.4	10.7	5.7	.08	.528	.272	.256	1.092	.388	.704	.02	.44

CHEMICAL EXAMINATION OF WATER FROM THE MISSISSIPPI RIVER AT ALTON. – ¼ distance from Illinois shore.—CONTINUED.
(Parts per 1,000,000.)

Serial Number.	1900. Date of Collection.	Date of Examination.	Appearance. Turbidity.	Appearance. Sediment.	Appearance. Color.	Residue on Evaporation. Total.	Residue on Evaporation. Dissolved.	Residue on Evaporation. Suspended.	Loss on Ignition. Total.	Loss on Ignition. Dissolved.	Chlorine.	Oxygen Consumed. Total.	Oxygen Consumed. By Dissolved.	Oxygen Consumed. By Suspended Matt'r	Nitrogen as Ammonia. Free Ammonia.	Albuminoid Ammonia. Total.	Albuminoid Ammonia. Dissolved.	Albuminoid Ammonia. Suspended	Organic Nitrogen. Total.	Organic Nitrogen. Dissolved.	Organic Nitrogen. Suspended	Nitrogen as Nitrites.	Nitrogen as Nitrates.
7543	May 16	May 17	d	c	.1	379.2	186.	193.2	34.	21.6	6.5	15.9	8.6	7.3	.08	.416	.224	.192	1.06	.548	.512	.025	.4
7594	" 23	" 24	d	c	.05	506.4	192.	314.4	46.	30.4	5.8	18.4	8.1	10.3	.064	.48	.112	.368	1.06	.26	.8	.02	.52
7633	" 30	" 31	d	m	.05	363.2	201.2	162.	39.2	32.8	6.3	13.	6.8	6.2	.016	.352	.192	.16	1.028	.452	.576	.015	1.32
7663	June 6	June 7	d	c	.03	378.	185.2	192.8	34.8	33.6	6.2	13.1	8.1	5.	.024	.368	.16	.208	.8	.52	.28	.009	.72
7715	" 13	" 14	d	c	.02	589.2	218.8	370.4	52.	40.	7.8	13.3	7.4	5.9	.02	.432	.224	.208	1.94	.484	1.456	.01	1.
7752	" 20	" 21	d	c	.01	329.2	232.4	96.8	38.4	34.8	6.8	10.6	6.4	4.2	.04	.272	.192	.08	.628	.244	.384	.007	.8
7794	" 27	" 28	d	d	.01	514.	210.4	303.6	69.6	42.	6.8	14.2	5.6	8.6	.042	.368	.192	.176	1.32	.372	.948	.025	.72
7828	July 4	July 5	d	l	.01	344.8	219.6	125.2	37.6	26.	8.5	10.6	7.7	2.9	.092	.304	.16	.144	.552	.42	.132	.012	1.
7905	" 11	" 12	d	l	.02	310.4	213.6	96.8	29.2	16.4	8.3	8.7	7.7	1.	.106	.272	.176	.096	.712	.356	.356	.013	.88
7979	" 18	" 19	d	l	.02	301.2	195.2	106.	26.8	20.	8.6	8.6	7.2	1.4	.062	.272	.192	.08	.84	.308	.532	.012	.68
8071	Aug. 1	Aug. 2	d	c	.03	474.4	152.4	322.	51.2	24.8	6.5	15.8	6.3	9.5	.072	.448	.176	.272	1.08	.356	.724	.004	.68
8121	" 8	" 9	d	c	.02	280.8	188.8	92.	63.2	52.	8.2	12.3	8.4	3.9	.118	.352	.192	.16	.84	.42	.42	.009	.48
8189	" 15	" 16	d	l	.02	276.8	186.8	90.	37.2	35.6	10.1	9.5	6.6	2.9	.108	.416	.176	.24	.68	.348	.332	.009	.48
8267	" 22	" 24	d	c	.1	701.6	138.4	563.2	63.6	20.8	5.4	18.4	5.7	12.7	.086	.72	.16	.56	1.336	.22	1.116	.003	.96
8324	" 29	" 30	d	c	.03	350.4	152.8	197.6	35.6	16.8	6.4	12.8	6.2	6.6	.117	.352	.16	.192	.52	....	.....	.004	.68
8379	Sept. 5	Sept. 6	vd	m	.05	333.6	182.8	150.8	34.	12.8	7.8	13.8	6.7	7.1	.084	.304	.192	.112	.6	.448	.152	.006	.76
Average Jan. 4—June 27						537.2	183.8	353.4	43.2	25.1	6.9	15.5	7.8	7.6	.316	.552	.203	.248	1.336	.456	.879	.016	.95
Average July 4—Sept. 5.............						374.8	181.1	193.7	42.	25.	7.7	12.2	6.9	5.3	.094	.382	.176	.206	.795	.359	.436	.008	.73
Average Jan. 4—Sept. 5.............						495.4	182.8	312.5	42.9	25.1	7.1	14.7	7.6	7.1	.259	.508	.196	.311	1.197	.434	.763	.014	.89

CHEMICAL EXAMINATION OF WATER FROM THE MISSISSIPPI RIVER AT ALTON.—Midstream.
(Parts per 1,000,000.)

Serial Number.	1900 Date of Collection.	Date of Examination.	Appearance. Turbidity.	Appearance. Sediment.	Appearance. Color.	Residue on Evaporation. Total.	Residue Dissolved.	Residue Suspended.	Loss on Ignition. Total.	Loss on Ignition. Dissolved.	Chlorine.	Oxygen Consumed. Total.	Oxygen Consumed. By Dissolved.	Oxygen Consumed. By Suspended Matt'r	Nitrogen as Ammonia. Free Ammonia.	Albuminoid Ammonia. Total.	Albuminoid Ammonia. Dissolved.	Albuminoid Ammonia. Suspended	Organic Nitrogen. Total.	Organic Nitrogen. Dissolved.	Organic Nitrogen. Suspended	Nitrogen as Nitrites.	Nitrogen as Nitrates.
6622	Jan. 4	Jan. 5	d	c	.04	282.8	272.8	10.	35.2	33.2	15.5	11.2	9.1	2.1	.72	.352	.272	.08	.76	.616	.144	.02	.6
6659	" 10	" 11	d	c	.06	265.6	235.6	30.	24.8	23.2	8.7	10.5	8.8	1.7	.52	.464	.208	.256	1.016	.28	.736	.012	.52
6700	" 17	" 18	d	c	.05	229.6	206.8	22.8	32.4	22.	6.7	10.2	8.9	1.3	.12	.4	.24	.16	.88	.64	.24	.006	.56
6747	" 24	" 25	d	m	.8	344.	187.6	156.4	45.2	28.	5.3	14.6	9.	5.6	.24	.448	.24	.208	1.04	.64	.4	.013	.8
6813	Feb. 2	Feb. 3	d	c	.1	305.2	230.	75.2	47.6	40.	10.6	12.6	9.4	3.2	.884	.368	.224	.144	.768	.576	.192	.014	.96
6858	" 7	" 8	d	c	.04	290.8	232.4	58.4	26.4	25.6	10.9	9.2	8.	1.2	.72	.384	.24	.144	.8	.576	.224	.013	.76
6904	" 14	" 15	vd	vm	.15	1315.2	152.	1163.2	43.6	20.8	4.1	23.7	19.5	4.2	.336	1.344	.24	1.104	3.04	.448	2.592	.013	1.08
7002	Mar. 2	Mar. 3	d	c	.05	371.6	172.	199.6	22.	21.2	5.4	14.1	9.4	4.7	.384	.432	.208	.224	.72	.48	.24	.011	.4
7055	" 9	" 10	vd	m	.1	892.	133.6	758.4	36.8	11.2	3.6	17.4	6.6	10.8	.288	.672	.208	.464	2.24	.48	1.76	.011	.8
7087	" 14	" 15	vd	vm	.2	1537.6	96.8	1440.8	35.6	12.4	1.	26.8	9.1	17.7	.368	1.216	.208	1.008	3.04	.514	2.496	.007	.6
7133	" 21	" 22	d	m	.3	490.8	105.2	385.6	45.6	13.6	2.4	21.5	8.8	12.7	.416	.96	.288	.672	2.2	.92	1.28	.008	.56
7178	" 28	" 29	d	m	.3	364.4	110.4	254.	27.2	21.2	3.	16.3	8.5	7.8	.4	.576	.192	.384	1.4	.568	.832	.01	.56
7235	Apr. 4	April 5	d	c	.25	314.4	134.4	180.	28.8	12.	3.	14.6	7.8	6.8	.256	.384	.224	.16	.856	.536	.32	.012	.68
7298	" 12	" 13	d	m	.25	571.2	167.2	404.	39.2	24.	1.	19.6	9.	10.6	.224	.864	.304	.56	2.12	.728	1.392	.03	1.
7343	" 18	" 19	d	c	.06	251.2	118.	133.2	25.6	13.6	3.	12.5	7.1	5.4	.128	.368	.144	.224	.84	.504	.336	.02	.72
7411	" 25	" 26	d	c	.2	829.6	104.8	724.8	63.2	9.6	1.	24.	8.9	15.1	.096	.768	.176	.592	1.96	.408	1.552	.024	.8
7455	May 2	May 3	d	c	.04	301.6	125.6	176.	26.8	22.8	3.4	14.6	7.8	6.8	.024	.48	.224	.256	.932	.42	.512	.007	.56
7495	" 9	" 10	d	m	.4	326.8	100.4	226.4	38.4	10.8	2.8	17.1	11.8	5.3	.08	.48	.224	.256	.84	.48	.36	.008	.32
7541	" 16	" 17	d	c	.4	365.2	121.2	244.	38.4	20.8	5.2	17.8	9.7	8.1	.068	.48	.144	.336	.642	.292	.35	.01	.24
7595	" 23	" 24	vd	vm	.05	570.	141.6	428.4	58.	40.4	3.6	16.6	8.1	8.5	.044	.48	.112	.368	1.156	.196	.96	.015	.32
7631	" 30	" 31	d	m	.2	306.	164.	142.	42.4	36.	4.4	12.2	7.4	4.8	.02	.32	.176	.144	.868	.308	.56	.01	.8
7665	June 6	June 7	d	c	.02	327.2	156.8	170.4	31.2	28.8	4.7	14.3	7.9	6.4	.02	.352	.192	.16	.8	.388	.412	.008	.36
7716	" 13	" 14	d	c	.04	338.	188.4	149.6	48.8	29.2	6.3	12.4	7.8	4.6	.032	.352	.176	.176	.98	.52	.46	.008	.48
7753	" 20	" 21	d	c	.04	296.4	210.4	86.	48.4	46.4	4.8	9.1	7.9	1.2	.044	.288	.192	.096	.612	.244	.368	.004	.32
7795	" 27	" 28	d	d	.01	546.	181.2	364.8	60.8	24.4	5.	15.1	5.6	9.5	.054	.496	.144	.352	1.32	.244	1.076	.013	.72
7829	July 4	July 5	d	l	.02	320.	184.8	135.2	40.	21.6	5.4	11.8	6.4	5.4	.078	.32	.128	.192	.68	.356	.324	.007	.24
7904	" 11	" 12	d	l	.02	317.2	212.4	104.8		36.4	6.5	9.3	6.8	2.5	.079	.272	.16	.112	.692	.26	.432	.012	

CHEMICAL EXAMINATION OF WATER FROM THE MISSISSIPPI RIVER AT ALTON.— Midstream.— CONTINUED.
(Parts per 1,000,000.)

Serial Number.	1900 Date of Collection.	Date of Examination.	Appearance. Turbidity.	Appearance. Sediment.	Appearance. Color.	Residue on Evaporation. Total.	Residue on Evaporation. Dissolved.	Residue on Evaporation. Suspended.	Loss on Ignition. Total.	Loss on Ignition. Dissolved.	Chlorine.	Oxygen Consumed. Total.	Oxygen Consumed. By Dissolved.	Oxygen Consumed. By Suspended Matt'r	Nitrogen as Ammonia. Free Ammonia.	Albuminoid Ammonia. Total.	Albuminoid Ammonia. Dissolved.	Albuminoid Ammonia. Suspended	Organic Nitrogen. Total.	Organic Nitrogen. Dissolved.	Organic Nitrogen. Suspended	Nitrogen as Nitrites.	Nitrogen as Nitrates.
7977	July 18	July 19	d	l	.02	300.	172.	128.	26.	20.	5.8	8.7	7.4	1.3	.062	.272	.176	.096	.58	.292	.288	.008	.36
8073	Aug. 1	Aug. 2	d	c	.02	554.4	135.2	419.2	48.	24.	4.2	16.7	8.4	8.3	.08	.528	.192	.336	1.16	.372	.788	.005	.72
8122	" 8	" 9	d	c	.02	272.4	170.8	101.6	82.8	61.2	4.7	14.	10.7	3.3	.104	.416	.208	.208	.92	.516	.404	.004	.36
8188	" 15	" 16	d	l	.02	230.4	159.2	71.2	39.2	33.6	6.6	10.8	7.3	3.5	.106	.416	.208	.208	.76	.316	.444	.005	.24
8268	" 22	" 24	d	c	.2	884.8	138.	746.8	59.6	22.	3.6	21.2	6.1	15.1	.152	.72	.192	.528	1.74	.316	1.424	.002	.76
8325	" 29	" 30	d	c	.02	375.2	139.6	235.6	42.	20.8	4.	15.2	6.8	8.4	.102	.48	.192	.288	.92	.284	.636	.003	.44
8378	Sept. 5	Sept. 6	vd	vm	...	321.6	160.4	161.2	34.	27.2	3.4	20.7	8.7	12.	.104	.352	.272	.08	.664	.268	.396	.003	.4
8449	" 12	" 13	d	m	.25	284.	140.	144.	34.4	20.4	3.8	17.2	11.6	5.6	.118	.48	.24	.24	.92	.448	.472	.005	.32
8508	" 19	" 20	d	c	.04	270.4	153.6	116.8	37.6	26.	3.4	15.1	12.7	2.4	.19	.48	.224	.256	.728	....	.....	.007	.48
8556	" 26	" 27	d	m	.7	314.8	147.2	167.6	48.8	23.6	2.8	18.	13.9	4.1	.136	.56	.192	.368	.984	.608	.376	.005	.28
8610	Oct. 3	Oct. 4	d	m	.9	504.	135.6	368.4	50.4	29.2	1.6	27.6	17.7	9.9	.17	.592	.288	.304	1.424	.624	.8	.002	.4
8670	" 16	" 17	d	c	.6	310.8	136.4	174.4	40.	26.4	1.6	22.1	17.3	4.8	.094	.432	.272	.16	1.188	.512	.676	.012	.628
8683	" 22	" 23	d	c	.8	326.8	122.	204.4	41.2	39.2	1.7	26.2	18.6	7.6	.23	.544	.288	.256	1.104	.544	.56	.014	.386
8713	" 29	" 30	d	c	1.3	288.8	132.	156.8	43.2	39.6	1.5	25.6	22.2	3.4	.112	.48	.272	.208	.816	.64	.176	.002	.438
8741	Nov. 5	Nov. 6	d	c	.5	261.2	135.6	125.6	37.6	24.	1.9	19.7	15.4	4.3	.18	.448	.288	.16	.912	.496	.416	.007	.353
8768	" 12	" 13	d	c	.7	294.	157.2	136.8	37.6	30.4	1.9	23.5	13.9	9.6	.151	.448	.208	.24	1.168	.656	.512	.009	.831
8790	" 19	" 20	d	l	.1	204.4	122.	82.4	26.4	24.8	1.6	20.8	17.7	3.1	.154	.352	.336	.016	.912	.8	.112	.005	.395
8822	" 26	" 27	d	c	.8	198.4	139.2	59.2	20.	19.2	2.3	19.1	16.3	2.8	.138	.352	.208	.144	.784	.624	.16	.006	.434
8851	Dec. 3	Dec. 4	d	l	.25	234.4	202.8	31.6	21.2	19.6	8.6	10.5	9.9	.6	.336	.324	.288	.036	.88	.544	.276	.018	1.262
8875	" 10	" 11	d	l	.3	239.6	203.6	36.	29.2	21.6	4.2	11.2	10.6	.6	.124	.224	.128	.106	.816	.432	.384	.014	.906
8897	" 17	" 18	d	l	.4	229.2	204.4	24.8	26.4	24.4	5.	11.	10.	1.	.109	.208	.112	.096	.624	.448	.176	.009	1.031
8918	" 24	" 25	d	l	.4	251.2	218.8	32.4	18.	14.	6.1	10.8	9.8	1.	.239	.304	.224	.08	.576	.4	.176	.008	1.072
Average Jan. 4—June 27						481.9	161.9	319.4	38.8	23.6	5.1	15.5	8.8	6.6	.259	.549	.208	.341	1.273	.481	.791	.012	.62
Average July 4—Dec. 24						324.5	159.2	165.2	38.5	27.	3.8	16.9	11.9	4.9	.131	.416	.22	.196	.914	.448	.465	.007	.555
Average Jan. 4—Dec. 27						404.5	160.6	243.8	38.7	25.3	4.4	16.2	10.3	5.8	.203	.484	.214	.27	1.097	.465	.531	.009	.588

CHEMICAL EXAMINATION OF WATER FROM THE MISSISSIPPI RIVER AT ALTON.—¼ distance from Missouri shore.
(Parts per 1,000,000.)

Serial Number.	1900. Date of Collection.	Date of Examination.	Appearance. Turbidity.	Appearance. Sediment.	Appearance. Color.	Residue on Evaporation. Total.	Residue Dissolved.	Residue Suspended.	Loss on Ignition. Total.	Loss on Ignition. Dissolved.	Chlorine.	Oxygen Consumed. Total.	Oxygen Consumed. By Dissolved.	Oxygen Consumed. By Suspended Matt'r	Nitrogen as Ammonia. Free Ammonia.	Albuminoid Ammonia. Total.	Albuminoid Ammonia. Dissolved.	Albuminoid Ammonia. Suspended	Organic Nitrogen. Total.	Organic Nitrogen. Dissolved.	Organic Nitrogen. Suspended	Nitrogen as Nitrites.	Nitrogen as Nitrates.
6623	Jan. 4	Jan. 5	d	c	.04	255.2	241.6	13.6	26.8	24.8	12.	10.7	9.2	1.5	.42	.384	.24	.144	.76	.448	.312	.013	.44
6660	" 10	" 11	d	c	.07	244.4	212.4	32.	25.2	18.8	6.3	10.9	9.	1.9	.2	.48	.176	.304	1.12	.448	.672	.006	.2
6701	" 17	" 18	d	c	.05	209.2	189.2	20.	34.2	34.2	5.1	10.9	9.	1.9	.036	.368	.16	.208	.8	.352	.448	.003	.08
6748	" 24	" 25	d	m	.06	322.4	164.8	157.6	31.6	20.	3.95	14.1	9.2	4.9	.08	.416	.16	.256	.96	.576	.384	.008	.76
6814	Feb. 2	Feb. 3	d	c	.1	288.8	227.6	61.2	29.6	26.	9.6	12.8	....	....	.74	.368	.24	.1?8	.8	.512	.288	.013	1.08
6859	" 7	" 8	d	c	.4	244.	201.2	42.8	20.	20.	8.2	9.3	7.6	1.7	.352	.384	.144	.24	.88	.32	.56	.009	.68
6903	" 14	" 15	vd	vm	.2	796.8	146.	650.8	42.8	14.	3.8	18.8	8.3	10.5	.16	1.04	.208	.832	1.84	.512	1.328	.013	1.
6953	" 21	" 22	d	m	.41	558.	156.8	401.2	84.	30.4	4.6	18.8	9.5	9.3	.416	.88	.304	.576	1.84	.672	1.168	.014	1.08
7003	Mar. 2	Mar. 3	d	c	.4	224.8	161.6	60.8	21.6	20.8	4.2	13.5	9.8	3.7	.352	.448	.288	.16	.88	.64	.24	.008	.64
7056	" 9	" 10	vd	m	.15	670.	112.	558.	40.	16.8	3.2	17.1	6.8	10.3	.208	.512	.208	.304	1.76	.512	1.248	.009	.84
7088	" 14	" 15	vd	vm	.4	1584.	100.4	1483.6	45.2	10.	.6	25.7	8.5	17.2	.24	1.312	.272	1.04	3.2	.544	2.656	.008	.64
7134	" 21	" 22	d	m	.5	577.2	116.4	460.8	38.	15.6	1.3	19.5	9.3	10.2	.464	.928	.288	.64	2.2	.864	1.338	.01	.68
7177	" 28	" 29	d	m	.5	359.2	125.6	233.6	27.6	20.8	2.9	16.3	8.6	7.7	.432	.576	.224	.352	1.304	.6	.704	.012	.4
7234	April 4	April 5	d	c	.06	344.	138.	206.	16.4	14.	3.5	14.2	7.5	6.7	.32	.4	.192	.208	.856	.504	.352	.013	.4
7299	" 12	" 13	d	m	.4	613.2	116.	497.2	37.6	18.	1.4	25.6	8.8	16.8	.224	.8	.256	.544	2.04	.6	1.44	.032	1.08
7344	" 18	" 19	d	c	.05	260.4	132.	128.4	20.8	17.2	3.6	13.	7.2	5.8	.112	.388	.208	.16	.84	.44	.4	.02	.72
7412	" 25	" 26	vd	vm	.3	913.6	110.4	803.2	46.4	16.8	1.1	25.7	7.3	18.4	.08	1.088	.176	.912	2.2	.44	1.76	.025	.72
7456	May 2	May 3	d	c	.05	328.4	168.8	159.6	22.8	22.	5.3	13.9	8.4	5.5	.04	.528	.176	.352	1.028	.42	.608	.014	.88
7496	" 9	" 10	d	m	.4	534.	109.6	424.4	26.	21.2	3.3	17.9	11.8	6.1	.084	.576	.256	.32	1.06	.388	.672	.01	.28

CHEMICAL EXAMINATION OF WATER FROM THE MISSISSIPPI RIVER AT ALTON.—¼ distance from Missouri shore—CONTINUED.
(Parts per 1,000,000.)

Serial Number.	1900. Date of		Appearance.			Residue on Evaporation.					Chlorine.	Oxygen Consumed.			Nitrogen as Ammonia				Organic Nitrogen.			Nitrogen as	
									Loss on Ignition.						Free Ammonia.	Albuminoid Ammonia.							
	Collection.	Examination.	Turbidity.	Sediment.	Color.	Total.	Dissolved.	Suspended.	Total.	Dissolved.		Total.	By Dissolved.	By Suspended Matt'r.		Total.	Dissolved.	Suspended.	Total.	Dissolved.	Suspended.	Nitrites.	Nitrates.
7544	May 16	May 17	d	c	.2	452.8	124.4	328.4	31.2	21.6	3.8	20.8	9.1	11.7	.074	.576	.144	.432	.74	.452	.288	.015	.1
7596	" 23	" 24	vd	vm	.1	649.2	146.4	502.8	58.8	38.4	3.1	21.1	8.1	13.7	.116	.512	.128	.384	1.94	.308	1.632	.022	.4
7630	" 30	" 31	d	m	.3	293.2	150.4	142.8	41.6	34.8	3.7	11.7	8.	3.7	.022	.288	.224	.064	.74	.5	.24	.013	.48
7667	June 6	June 7	d	c	.07	324.4	141.6	182.8	44.4	21.2	3.9	13.3	8.5	4.8	.032	.384	.112	.272	.8	.154	.646	.01	.4
7717	" 13	" 14	d	c	.04	263.6	180.8	82.8	42.4	27.2	4.4	12.5	8.3	4.2	.02	.32	.192	.128	.9	.452	.448	.007	.08
7754	" 20	" 21	d	c	.05	275.6	192.	83.6	40.4	38.	3.6	11.	9.5	1.5	.036	.288	.16	.128	.58	.244	.336	.004	.08
7796	" 27	" 28	d	c	.01	560.4	164.4	396.	56.8	28.	3.7	15.1	5.7	9.4	.074	.528	.304	.224	1.288	.296	.992	.013	.56
7830	July 4	July 5	d	l	.02	311.2	181.2	130.	27.2	24.8	3.8	11.7	7.	4.7	.072	.304	.112	.192	.68	.228	.452	.004	.28
7903	" 11	" 12	d	l	.05	319.6	195.6	124.	46.8	38.4	4.8	10.7	7.1	3.6	.082	.32	.176	.144	.724	.212	.512	.005	.36
7980	" 18	" 19	d	l	.02	279.6	168.	111.6	24.	16.4	4.3	11.3	7.7	3.6	.048	.272	.24	.032	.76	.292	.468	.005	.16
8075	Aug. 1	Aug. 2	d	c	.02	574.4	127.6	446.8	56.	32.	3.3	18.2	8.7	9.5	.092	.528	.208	.32	1.4	.404	.996	.003	.68
8123	" 8	" 9	d	c	.02	270.	145.6	124.4	58.	42.4	3.8	16.2	11.1	5.1	.102	.416	.288	.128	.92	.436	.484	.003	.4
8187	" 15	" 16	d	l	.02	227.6	149.6	78.	46.4	36.	4.6	11.2	8.3	2.9	.098	.416	.208	.208	.76	.412	.348	.002	.24
8269	" 22	" 24	d	c	.1	896.8	126.	770.8	57.2	18.	3.4	21.4	6.	15.4	.134	.8	.192	.608	1.336	.316	1.01	.002	.76
8326	" 29	" 30	d	c	.2	382.	141.6	240.4	39.2	22.	3.	15.7	7.4	8.3	.106	.48	.192	.288	.92	.236	.684	.002	.44
8377	Sept. 5	Sep. 6	vd	vm	...	336.8	160.4	176.4	31.6	21.2	3.	16.5	8.9	7.6	.078	.432	.304	.128	.76	.428	.332	.004	.36
Aaverage Jan. 4—June 27						467.1	155.	312.1	36.6	22.7	4.2	15.9	8.1	7.2	.204	.567	.209	.358	1.28	.469	.873	.012	.56
Average July 4—Sept. 5............						398.6	155.2	243.3	42.9	27.9	3.7	14.7	8.0	6.7	.091	.44	.213	.227	.917	.329	.588	.003	.41
Average Jan. 4—Sept. 5............						449.7	155.	294.7	38.2	24.	4.1	15.6	8.1	7.4	.175	.534	.21	.32	1.188	.433	.754	.009	.52

CHEMICAL EXAMINATION OF WATER FROM THE MISSISSIPPI RIVER AT ALTON.—100 ft. from Missouri shore.
(Parts per 1,000,000.)

Serial Number.	1900. Date of		Appearance.			Residue on Evaporation.					Chlorine.	Oxygen Consumed.			Nitrogen as Ammonia				Organic Nitrogen.			Nitrogen as	
									Loss on Ignition.						Free Ammonia.	Albuminoid Ammonia.							
	Collection.	Examination.	Turbidity.	Sediment.	Color.	Total.	Dissolved.	Suspended.	Total.	Dissolved.		Total.	By Dissolved.	By Suspended Matt'r		Total.	Dissolved.	Suspended.	Total.	Dissolved.	Suspended	Nitrites.	Nitrates.
6624	Jan. 4	Jan. 5	d	c	.03	262.8	244.4	18.4	27.2	16.	12.9	10.5	8.9	1.6	.42	.416	.224	.192	1.	.456	.544	.01	.28
6661	" 10	" 11	d	c	.08	222.	200.4	21.6	26.4	19.6	5.1	12.9	10.8	2.1	.028	.464	.208	.256	.92	.448	.472	.003	.12
6702	" 17	" 18	d	c	.05	197.2	190.8	6.4	28.	27.6	4.7	10.8	9.1	1.7	.036	.384	.176	.208	.8	.544	.256	.001	.16
6749	" 24	" 25	d	m	.2	327.6	174.4	153.2	44.	30.	3.6	14.4	9.6	4.8	.048	.432	.192	.24	1.04	.512	.528	.008	.72
6815	Feb. 2	Feb. 3	d	c	.1	276.4	234.	42.4	31.6	23.2	9.2	12.	9.1	2.9	.74	.384	.256	.128	.768	.544	.224	.014	.88
6860	" 7	" 8	d	c	.3	229.2	199.2	30.	38.4	12.8	8.4	9.4	8.5	.9	.352	.336	.224	.112	.72	.544	.176	.008	.68
6902	" 14	" 15	v d	v m	.06	617.6	146.4	471.2	32.4	22.8	3.4	17.9	8.	9.9	.192	.96	.256	.704	1.92	.544	1.376	.011	.88
6954	" 21	" 22	d	m	.3	496.	150.	346.	86.	21.2	3.8	16.2	10.5	5.7	.3515	.768	.256	.512	1.6	.768	.832	.015	.8
7004	Mar. 2	Mar. 3	d	c	.4	213.2	174.	39.2	24.8	24.8	4.2	13.7	11.5	2.2	.208	.336	.288	.048	.72	.64	.08	.01	1.08
7057	" 9	" 10	v d	m	.5	814.	82.4	731.6	41.6	9.2	1.	17.9	6.4	11.5	.176	.64	.192	.448	2.08	.32	1.76	.011	.8
7089	" 14	" 15	v d	v m	.6	1460.	83.2	1376.8	32.8	12.8	.8	23.	7.5	15.5	.224	1.184	.176	1.008	2.72	.384	2.336	.007	.8
7135	" 21	" 22	d	m	.6	590.	130.4	459.6	30.4	14.8	2.6	19.2	13.6	5.6	.416	.896	.32	.576	2.04	.952	1.088	.009	.68
7176	" 28	" 29	d	m	.5	500.	133.2	366.8	34.	14.8	2.4	17.	9.6	7.4	.416	.608	.24	.368	1.368	.664	.701	.012	.56
7237	Apr. 4	April 5	d	m	.2	39.2	139.2	220.	22.8	12.4	3.4	14.1	7.4	6.7	.336	.416	.192	.224	.856	.568	.288	.011	.72
7300	" 13	" 14	d	m	.25	676.8	129.2	547.6	57.2	17.6	1.1	23.1	9.1	14.	.24	.896	.288	.608	2.2	.632	1.568	.034	.92
7345	" 18	" 19	d	c	.1	294.4	123.2	171.2	36.4	21.6	3.8	12.9	7.6	5.3	.112	.32	.176	.144	.856	.536	.32	.02	.72
7413	" 25	" 26	d	m	.3	886.	106.8	779.2	46.	18.8	3.	23.4	7.9	15.5	.064	1.024	.192	.832	2.12	.472	1.648	.025	.92
7457	May 2	May 3	d	c	.05	474.8	136.8	338.	41.6	23.6	3.8	16.	7.9	8.1	.02	.496	.176	.32	1.06	.36	.7	.012	.64
7497	" 9	" 10	d	m	.5	599.6	103.2	496.4	43.2	19.2	2.8	18.5	12.9	5.6	.116	.592	.272	.32	1.124	.84	.284	.01	.4
7545	" 16	" 17	d	c	.3	344.8	140.8	204.	30.8	22.	3.3	20.6	10.2	10.4	.664	.416	.304	.112	1.284	.452	.832	.017	.32
7597	" 23	" 24	v d	v m	.2	645.6	147.6	498.	57.2	32.4	2.9	19.8	7.9	11.9	.124	.56	.112	.448	1.22	.34	.88	.02	.4
7629	" 30	" 31	d	m	.05	392.8	219.6	173.2	48.4	39.2	7.5	11.9	8.	3.9	.024	.4	.208	.192	1.12	.52	.6	.014	.8
7666	June 6	June 7	d	c	.2	320.4	136.	184.4	29.2	22.8	4.	13.3	8.5	4.8	.028	.4	.112	.288	.8	.154	.646	.011	.36
7718	" 13	" 14	d	c	.04	246.	176.8	69.2	38.	28.4	4.6	9.5	8.5	1.	.02	.288	.224	.064	1.22	.52	.7	.006	.2
7755	" 20	" 21	d	c	.1	25.4	180.	72.4	26.4	25.6	4.	11.1	8.2	2.9	.04	.272	.144	.128	.58	.244	.336	.004	.04
7797	" 27	" 28	d	c	.01	519.2	172.4	346.8	56.	36.4	3.2	14.3	6.4	7.9	.086	.384	.176	.208	1.16	.548	.612	.014	.4
7831	July 4	July 5	d	l	.03	295.2	174.	121.2	34.8	28.8	4.2	11.7	7.5	4.2	.056	.256	.144	.112	.52	.308	.212	.004	.24

CHEMICAL EXAMINATION OF WATER FROM THE MISSISSIPPI RIVER AT ALTON.–100 ft. from Missouri shore.—CONTINUED.
(Parts per 1,000,000.)

Serial Number.	1900 Date of Collection.	1900 Date of Examination.	Appearance. Turbidity.	Appearance. Sediment.	Appearance. Color.	Residue on Evaporation. Total.	Residue on Evaporation. Dissolved.	Residue on Evaporation. Suspended.	Residue on Evaporation. Loss on Ignition. Total.	Residue on Evaporation. Loss on Ignition. Dissolved.	Chlorine.	Oxygen Consumed. Total.	Oxygen Consumed. By Dissolved.	Oxygen Consumed. By Suspended Matt'r.	Nitrogen as Ammonia. Free Ammonia.	Nitrogen as Ammonia. Albuminoid Ammonia. Total.	Nitrogen as Ammonia. Albuminoid Ammonia. Dissolved.	Nitrogen as Ammonia. Albuminoid Ammonia. Suspended	Organic Nitrogen. Total.	Organic Nitrogen. Dissolved.	Organic Nitrogen. Suspended	Nitrogen as Nitrites.	Nitrogen as Nitrates.
7902	July 11	July 12	d	l	.05	295.2	192.8	102.4	40.	36.8	4.2	9.2	7.3	1.9	.084	.272	.176	.096	.408	.244	.464	.004	.36
7978	" 18	" 19	d	l	.02	242.	159.6	82.4	23.2	21.2	4.6	8.7	6.7	2.	.048	.224	.144	.08	.44	.292	.148	.005	.36
8074	Aug. 1	Aug. 2	d	c	.02	624.8	131.6	493.2	48.	34.8	2.8	17.7	8.1	9.6	.05	.608	.16	.448	1.24	.452	.788	.004	.68
8123	" 8	" 9	d	c	.02	270.	145.6	124.4	58.	42.4	3.8	16.2	11.1	5.1	.102	.416	.288	.128	.92	.436	.484	.003	.4
8186	" 15	" 16	d	l	.02	210.4	137.2	73.2	36.	34.4	3.4	12.	8.7	3.3	.086	.416	.16	.256	.76	.332	.428	.001	.12
8270	" 22	" 24	d	c	.1	820.4	128.	692.4	54.4	15.2	3.4	19.9	6.1	13.8	.146	.72	.24	.48	1.08	.316	.764	.002	.76
8327	" 29	" 30	d	c	.02	380.4	138.4	242.	44.	18.4	3.4	13.8	6.8	7.	.1	.48	.16	.32	.984	.252	.732	.001	.6
8376	Sept. 5	Sept. 6	v d	vm	....	361.2	168.8	192.4	27.2	20.8	3.2	17.	8.9	8.1	.072	.352	.304	.048	.92	.3	.62	.003	.4
8448	" 12	" 13	d	m	.45	279.2	149.6	129.6	39.6	18.	2.8	17.2	10.8	6.4	.078	.4	.24	.16	.792	.576	.216	.005	.32
8502	" 19	" 20	d	c	.4	267.2	152.4	114.8	32.	26.	2.8	15.3	12.6	2.7	.12	.368	.208	.16	.888	.304	.584	.008	.56
8555	" 26	" 27	d	m	.6	315.2	147.2	168.	40.4	25.2	2.2	17.8	14.5	3.3	.16	.496	.224	.272	.952	.48	.472	.005	.36
8609	Oct. 3	Oct. 4	d	m	.1	573.6	137.6	436.	48.4	29.6	2.	27.7	17.2	10.5	.124	.656	.24	.416	1.28	.576	.704	.001	.52
8671	" 16	" 17	d	c	.6	329.6	142.8	186.8	42.8	29.6	1.8	21.9	17.4	4.5	.112	.4	.224	.176	1.344	.56	.784	.012	.588
8684	" 22	" 23	d	c	.9	359.6	126.4	233.2	46.8	37.2	1.3	24.8	18.	6.8	.276	.528	.288	.24	1.024	.592	.432	.017	.503
8714	" 29	" 30	d	c	1.3	330.8	139.6	191.2	58.8	50.4	2.4	27.3	21.5	5.8	.16	.448	.272	.176	1.072	.672	.4	.002	.438
8740	Nov. 5	Nov. 6	d	c	.5	296.4	142.8	153.6	45.6	24.8	2.9	21.1	15.6	5.5	.162	.48	.32	.16	1.136	.544	.592	.01	.31
8769	" 12	" 13	d	c	.7	364.4	146.	218.4	38.	29.6	2.3	23.2	11.9	11.3	.134	.448	.32	.128	1.136	.736	.4	.011	.829
8788	" 19	" 20	d	l	.9	226.4	136.	90.4	31.2	27.6	2.2	21.	17.3	3.7	.166	.384	.32	.064	.752	.656	.096	.006	.634
8821	" 26	" 27	d	c	.6	233.2	148.8	84.4	24.	22.8	2.1	19.6	15.9	3.7	.14	.352	.224	.128	.784	.624	.16	.015	.465
8850	Dec. 3	Dec. 4	d	l	.3	200.	159.2	40.8	20.8	20.4	2.6	13.9	12.8	1.1	.088	.256	.24	.032	.56	.496	.054	.008	.632
8876	" 10	" 11	d	l	.4	209.2	180.	29.2	27.2	24.	2.4	12.	11.5	.5	.078	.272	.192	.08	.4	.352	.048	.013	.507
8895	" 17	" 18	d	l	.6	193.2	185.6	7.6	23.6	21.2	2.7	11.5	11.2	.3	.03	.208	.112	.096	.688	.448	.24	.004	.716
8916	" 24	" 25	d	l	.5	208.8	188.4	20.4	12.4	12.	3.9	11.6	10.7	.9	.1	.32	.224	.096	.672	.272	.4	.007	.753
Average Jan. 4—June 27						469.9	155.9	313.9	38.8	21.9	4.2	15.5	8.6	6.9	.191	.548	.214	.334	1.15	.519	.631	.012	.587
Average July 4—Dec. 24						328.6	148.2	180.3	37.8	27.1	2.8	17.1	12.1	5.1	.117	.398	.226	.172	.877	.451	.426	.006	.498
Average Jan. 4—Dec. 24						402.	154.2	249.8	38.1	24.4	3.5	16.3	10.4	5.8	.155	.480	.22	.26	1.019	.486	.532	.009	.544

CHEMICAL EXAMINATION OF WATER FROM THE ILLINOIS AND MICHIGAN CANAL AT LOCKPORT.
(Parts per 1,000,000.)

Serial Number.	1901 Date of Collection.	1901 Date of Examination	Appearance. Turbidity.	Appearance. Sediment.	Appearance. Color.	Residue on Evaporation. Total.	Residue on Evaporation. Dissolved.	Residue on Evaporation. Suspended.	Residue on Evaporation. Loss on Ignition. Total.	Residue on Evaporation. Loss on Ignition. Dis-solved.	Chlorine.	Oxygen Consumed. Total.	Oxygen Consumed. By Dis-solved.	Oxygen Consumed. By Suspended Matt'r.	Nitrogen as Ammonia. Free Ammonia.	Nitrogen as Ammonia. Albuminoid Ammonia. Total.	Nitrogen as Ammonia. Albuminoid Ammonia. Dis-solved.	Nitrogen as Ammonia. Albuminoid Ammonia. Sus-pended	Organic Nitrogen. Total.	Organic Nitrogen. Dissolved.	Organic Nitrogen. Suspended	Nitrogen as Nitrites.	Nitrogen as Nitrates.
8966	Jan. 22	Jan. 23	d	l	.....	514.4	494.4	20.	34.8	30.	93.5	18.5	18.3	.2	14.4	2.08	1.376	.704	3.584	2.592	.992	.005	.315
9008	Feb. 21	Feb. 21	d	vl	.4*.4	464.8	462.8	2.	45.2	28.8	56.	14.8	14.	.8	6.	.704	.704	.....	1.552	1.472	.08	.01	.15
9073	Apr. 14	Apr. 17	s	l	.2*.2	512.4	498.	14.4	87.5	50.8	71.	13.1	12.3	.8	13.6	.576	.48	.096	1.424	1.104	.32	.055	.465
9110	May 12	May 15	d	l	.3	504.8	479.6	25.2	46.8	37.2	143.	21.2	15.9	5.3	15.6	.752	.48	.272	2.752	1.52	1.232	none	.12
9168	July 8	July 12	d	l	.2	544.4	515.2	29.2	50.	34.	137.	16.5	12.7	3.8	14.4	1.024	.576	.448	1.744	1.104	.64	"	.04
9209	" 22	" 24	d	l	.08	508.8	486.	22.8	36.	29.2	158.	15.1	14.	1.1	16.8	.992	.48	.512	1.952	.752	1.2	"	.12
9222	" 29	" 30	d	c	.08	458.4	398.8	59.6	35.2	28.8	117.	16.1	15.6	.5	14.4	.72	.352	.368	1.104	.944	.16	.019	.221
9272	Aug. 5	Aug. 6	d	l	.4	601.6	591.2	10.4	31.2	20.8	207.	18.6	15.6	3.	20.8	1.?8	.72	.56	3.552	1.428	2.124	none	.12
9291	" 12	" 13	d	c	.2	380.8	379.2	1.6	27.2	27.2	111.5	13.3	11.6	1.7	13.6	.576	.352	.224	1.424	.704	.72	"	.12
9310	" 19	" 20	d	l	.2	533.2	496.4	36.8	24.	16.	178.	17.5	14.9	2.6	18.4	1.2	.576	.624	2.432	1.112	2.32	"	.08
9322	" 26	" 27	d	c	.3	607.6	587.2	20.4	72.	38.8	206.	18.2	15.2	3.	20.4	1.312	.656	.656	2.352	1.264	1.088	"	.16
9347	Sept. 2	Sept. 3	d	l	.2	482.8	477.2	5.6	34.8	23.6	160.5	15.9	12.9	3.	18.4	1.024	.688	.336	1.952	1.456	.496	"	.08
9480	" 9	Oct. 15	d	c	.2	563.6	532.8	30.4	30.8	18.4	210.	17.8	9.6	8.2	32.	1.6	.56	1.04	.....	.....	.....	.012	.068
9381	" 16	Sept. 17	d	c	.3	652.4	582.4	70.	50.4	35.6	193.	26.3	12.9	13.4	16.	1.28	.992	.288	.....	.....	.....	none	.08
9397	" 23	" 24	d	c	.2	649.2	616.4	32.8	40.	29.2	207.5	23.8	14.7	9.1	18.4	1.152	.64	.512	.....	.....	.....	"	.16
9421	" 30	Oct. 1	d	c	.2	602.	550.	52.	34.4	4.	191.	19.9	16.2	3.7	16.8	1.44	1.056	.384	.....	.....	.....	"	.24
9444	Oct. 7	" 8	vd	c	.....	644.	603.6	40.4	31.6	25.2	212.	27.3	15.4	11.9	31.2	1.28	.432	.848	.....	.....	.....	"	.16

*Not filtered.
The odor was uniformly gassy or musty. The color upon ignition was brown.

CHEMICAL EXAMINATION OF WATER FROM THE ILLINOIS AND MICHIGAN CANAL AT LOCKPORT.—CONTINUED.
(Parts per 1,000,000.)

Serial Number.	1901 Date of Collection.	1901 Date of Examination.	Appearance. Turbidity.	Appearance. Sediment.	Appearance. Color.	Residue on Evaporation. Total.	Residue on Evaporation. Dissolved.	Residue on Evaporation. Suspended.	Residue on Evaporation. Loss on Ignition. Total.	Residue on Evaporation. Loss on Ignition. Dissolved.	Chlorine.	Oxygen Consumed. Total.	Oxygen Consumed. By Dissolved.	Oxygen Consumed. By Suspended Matt'r	Nitrogen as Ammonia. Free Ammonia.	Nitrogen as Ammonia. Albuminoid Ammonia. Total.	Nitrogen as Ammonia. Albuminoid Ammonia. Dissolved.	Nitrogen as Ammonia. Albuminoid Ammonia. Suspended	Organic Nitrogen. Total.	Organic Nitrogen. Dissolved.	Organic Nitrogen. Suspended	Nitrogen as Nitrites.	Nitrogen as Nitrates.
9478	Oct. 14	Oct. 15	d	c	.2	626.8	586.8	40.	41.6	27.6	230.	25.1	16.5	8.6	35.2	1.6	1.344	.256	....	....	....	.006	.234
9550	" 21	" 22	v d	m	.4	694.8	646.4	48.4	60.	25.6	245.	26.2	9.	17.2	28.8	1.68	.8	.88	....	....	....	none	.24
9590	" 28	" 28	d	c	.2	676.4	659.6	16.8	46.	37.2	260.	25.8	15.8	10.	32.8	1.6	.8	.8	....	....	....	"	.24
9661	Nov. 4	Nov. 5	d	c	.3	459.2	442.	17.2	29.2	24.	165.	12.4	5.5	3.9	20.	1.04	.896	.144	....	....	....	.003	.077
9722	" 11	" 12	d	l	......	470.	464.	.6	32.	28.8	154.	16.9	11.7	5.2	16.8	1.28	.896	.384	....	....	....	none	.16
9806	" 18	" 19	d	l	.3	724.4	627.6	96.8	42.	32.	240.	23.9	17.7	6.2	14.	2.08	1.68	.4	....	....	....	"	.16
9878	" 25	" 26	d	c	......	616.8	563.6	53.2	62.8	26.	210.	27.6	13.3	14.3	14.4	1.76	.336	1.424	....	....	....	"	.16
9953	Dec. 2	Dec. 3	d	l	.05	423.6	393.6	30.	22.8	18.8	120.	24.2	7.4	16.8	17.6	1.056	.416	.64	....	....	....	"	.08
10031	" 9	" 10	d	l	.05	264.4	260.	4.4	22.	21.6	60.	11.7	6.7	5.	7.2	.48	.32	.16	....	....	....	.015	.265
10099	" 16	" 17	d	l	.02	310.	293.2	16.8	40.	23.2	54.	8.9	7.	1.9	7.04	.64	.32	.32	....	....	....	.03	.53
10134	" 23	" 24	v d	m	.01	746.4	274.4	472.	88.	22.	43.	48.5	12.1	36.4	6.56	3.2	.288	2.912	....	....	....	none	.4
10153	" 30	" 31	d	l	.05*.1	283.2	282.4	.8	36.	.8	59.	11.	10.2	.8	4.8	.4	.288	.112	....	....	....	.021	.219
Average Jan. 22—May 12						498.6	484.2	14.4	53.5	36.7	90.8	16.9	15.1	1.8	12.4	1.028	.76	.268	2.328	1.672	.656	.023	.262
Average July 8—Dec. 30						542.7	497.1	45.6	39.8	25.8	161.4	20.1	12.7	7.4	3.1	1.256	.659	.597	1.997	1.172	.825	.012	.171
Average Jan. 22—Dec. 30						525.1	491.9	33.2	55.3	30.1	133.2	18.8	13.7	5.1	6.8	1.165	.699	.466	2.186	1.457	.729	.013	.208

*Not Filtered.
The odor was uniformly gassy or musty. The color upon ignition was brown.

CHEMICAL EXAMINATION OF WATER FROM THE SANITARY CANAL AT LOCPORT.
(Parts Per 1,000,000.)

Serial Number.	1901 Date of		Appearance.			Residue on Evaporation.					Chlorine.	Oxygen Consumed.			Nitrogen as Ammonia				Organic Nitrogen.			Nitrogen as	
	Collection.	Examination	Turbidity.	Sediment.	Color.	Total.	Dissolved.	Suspended.	Loss on Ignition. Total.	Loss on Ignition. Dissolved.		Total.	By Dissolved.	By Suspended Matt'r	Free Ammonia.	Albuminoid Ammonia. Total.	Albuminoid Ammonia. Dissolved.	Albuminoid Ammonia. Suspended	Total.	Dissolved.	Suspended	Nitrites.	Nitrates.
8965	Jan. 22	Jan. 23	d	l	.05	201.2	191.2	10.	12.	12.	17.	7.8	5.5	2.3	2.	.416	.24	.176	.994	.496	.448	.012	.268
9034	Mar. 15	Mar. 18	d	c	.3	233.6	197.2	36.4	24.4	22.8	16.	13.6	9.7	3.9	1.168	.656	.304	.352	1.952	.88	1.072	.038	.682
9072	Apr. 14	Apr. 17	d	l	.01	204.4	189.2	15.2	23.6	23.6	17.	8.	6.3	1.7	1.64	.352	.208	.144	.72	.448	.272	.019	.221
9109	May 12	May 15	d	v l	.1*.2	183.2	173.2	10.	30.4	30.	11.	6.2	5.6	.6	1.248	.4	.224	.176	.784	.512	.272	none	.2
9132	June 11	June 13	d	v l	.1*.2	184.8	183.2	1.6	39.2	37.2	11.	7.6	6.2	1.4	1.408	.432	.272	.16	1.008	.496	.512	"	.28
9167	July 8	July 12	d	l	.1	233.2	224.	9.2	32.	31.2	15.	7.8	6.3	1.5	2.	.48	.288	.192	1.2	.832	.368	"	.08
9210	" 22	" 24	d	l	.02	205.2	178.8	27.4	27.6	18.	13.	7.3	6.7	.5	2.	.256	.128	.128	.624	.432	.192	.004	.12
9271	Aug. 5	Aug. 6	d	l	.04	198.4	167.2	31.2	14.8	8.	14.	8.9	6.	2.9	1.344	.48	.256	.224	1.072	.368	.704	.001	.08
9292	" 12	" 13	d	c	.05	194.4	163.6	30.8	32.4	32.4	12.	8.6	7.1	1.5	1.52	.32	.224	.096	.752	.464	.288	.003	.157
9311	" 19	" 20	d	l	.02*.03	187.2	176.	11.2	18.8	18.8	11.5	9.4	8.2	1.2	1.62	.304	.192	.112	.784	.464	.32	.006	.154
9323	" 26	" 27	d	l	.04	197.6	184.	13.6	16.4	16.4	12.5	9.3	6.9	2.4	1.68	.336	.224	.112	.784	.48	.304	none	.16
9348	Sept. 2	Sept. 3	d	l	.05	179.6	151.2	28.4	13.2	13.2	12.	7.8	7.	.8	1.408	.32	.192	.128	.752	.352	.4	"	.08
9481	" 9	Oct. 15	d	c	.04	188.	154.8	33.2	15.6	13.6	13.	9.2	5.5	3.7	2.8	.224	.144	.08	……	……	……	.2	none
9382	" 16	Sept. 17	d	c	…….	190.8	182.8	8.	4.8	….	11.	8.9	7.5	.14	1.6	.32	.16	.16	……	……	……	none	.08
9399	" 23	" 24	d	c	.01	180.	156.8	23.2	16.4	14.4	10.	6.4	5.9	.5	1.312	.288	.192	.096	……	……	……	"	.2
9418	" 30	Oct. 1	d	c	.01	188.8	146.4	42.4	28.	12.4	15.	12.6	10.	2.6	1.472	.56	.256	.304	……	……	……	"	.16
9443	Oct. 7	" 8	d	l	.04	175.2	160.8	14.4	18.8	12.8	13.	8.2	7.8	.4	1.36	.4	.288	.112	……	……	……	"	.16

*Not filtered.

CHEMICAL EXAMINATION OF WATER FROM THE SANITARY CANAL AT LOCKPORT—CONTINUED.

(Parts per 1,000,000.)

Serial Number.	1901 Date of Collection.	1901 Date of Examination.	Appearance. Turbidity.	Appearance. Sediment.	Appearance. Color.	Residue on Evaporation. Total.	Residue on Evaporation. Dissolved.	Residue on Evaporation. Suspended.	Loss on Ignition. Total.	Loss on Ignition. Dissolved.	Chlorine.	Oxygen Consumed. Total.	Oxygen Consumed. By Dissolved.	Oxygen Consumed. By Suspended Matt'r	Nitrogen as Ammonia. Free Ammonia.	Albuminoid Ammonia. Total.	Albuminoid Ammonia. Dissolved.	Albuminoid Ammonia. Suspended	Organic Nitrogen. Total.	Organic Nitrogen. Dissolved.	Organic Nitrogen. Suspended	Nitrogen as Nitrites.	Nitrogen as Nitrates.
9476	Oct. 14	Oct. 15	d	c	.05	174.4	156.	18.4	20.	26.4	12.2	11.2	10.3	.9	1.504	.576	.32	.256	.....	......	......	.012	.068
9547	" 21	" 22	d	c	.03	198.	175.6	22.4	20.8	20.4	14.	7.1	6 8	.3	1.76	.368	.256	.112	.....	......	......	.001	.28
9591	" 28	" 28	d	l	.03	172.8	155.2	17.6	28.4	18.4	12.	7.8	6.3	1.5	1.6	.336	.224	.112	.....	......	......	.038	.282
9660	Nov. 4	Nov. 5	d	c	.05	176.	129.6	46.4	33.2	26.	14.	8.	6.1	1.9	1.44	.432	.262	.17	.....	......	......	.024	.096
9721	" 11	" 12	d	l	.....	164.8	146.4	18.4	28.8	26.8	11.	7.8	4.3	3.5	1.36	.32	.256	.064	.....	......	......	.016	.144
9805	" 18	" 19	d	l	.02	176.	138.	38.	10.8	7.6	11.	6.4	5.	1.4	1.184	.288	.192	.096	.....	......	......	.01	.19
9875	" 25	" 26	d	l	.02	176.	158.	18.	25.6	19.6	12.	7 2	5.	2.2	1.376	.352	.192	.16	.....	......	......	.016	.144
9952	Dec. 2	Dec. 3	d	l	.01*.1	205.6	143.6	62.	16.4	15.2	19.	7.1	6.9	.2	2.88	.336	.256	.08	.....	......	......	.01	.23
10029	" 9	" 10	d	l	.03	183.2	182.8	.4	21.2	14.	22.	8.7	5.6	3.1	3.04	.48	.256	.224	.....	......	......	.02	.14
10100	" 16	" 17	d	c	.04	258.	216.	42.	26.4	17.2	35.	16.2	7.1	9.1	4.32	.8	.304	.496	.....	......	......	.035	.385
10135	" 23	" 24	d	l	.01	192.4	176.8	15.6	23.2	16.8	24.	10.3	9.5	.8	2.68	.528	.224	.304	.....	......	......	.016	.384
10156	" 30	" 31	d	c	.05	231.2	224.	7.2	23.6	10.4	21.	9.9	7.2	2.7	3.36	.64	.24	.4	.....	......	......	.012	.228
Average Jan. 22—June 11						201.4	186.8	14.6	25.9	25.12	14.4	8.6	6.6	1.9	1.492	.451	.249	.202	1.081	.566	.515	.023	.33
Average July 8—Dec.30.						194.4	171.1	23.3	22.4	16.8	14.3	9.8	6.8	3.	1.908	.399	.228	.171	.837	.476	.361	.068	.122
Average Jan. 22—Dec. 30						197.5	178.1	19.4	24.	21.5	14.5	9.2	6.7	2.5	1.715	.422	.238	.184	.99	.532	.458	.031	.183

*Not Filtered.

The water was invariably possessed of the characteristic musty odor of diluted sewage. The residue upon ignition was always either dark gray or brown.

CHEMICAL EXAMINATION OF WATER FROM THE DESPLAINES RIVER AT JOLIET.—East Side
(Parts per 1,000,000.)

Serial Number.	1901 Date of Collection.	Examination	Appearance. Turbidity.	Sediment.	Color.	Residue on Evaporation. Total.	Dissolved.	Suspended.	Loss on Ignition. Total.	Dissolved.	Chlorine.	Oxygen Consumed. Total.	By Dissolved.	By Suspended Matt'r	Nitrogen as Ammonia Free Ammonia.	Albuminoid Ammonia. Total.	Dissolved.	Suspended	Organic Nitrogen. Total.	Dissolved.	Suspended	Nitrogen as Nitrites.	Nitrates.
8964	Jan. 22	Jan. 23	d	1	.05	223.6	194.	29.6	12.	9.2	17.5	8.5	6.7	1.8	2.	.56	.304	.256	1.168	.544	.642	.015	.225
9006	Feb. 20	Feb. 21	d	1	.2*.3	194.	193.2	.8	24.	14.	15.	8.4	6.5	1.9	1.36	.48	.32	.16	1.104	.624	.48	.01	.43
9035	Mar 15	Mar. 18	d	c	.3	252.8	193.6	69.2	33.6	24.4	13.	15.2	10.3	4.9	1.136	.72	.304	.418	1.632	.816	.816	.026	.974
9071	Apr. 14	Apr. 17	d	1	.01	214.4	202.	12.4	24.	39.	15.	8.6	5.9	2.7	1.6	.256	.208	.048	.608	.304	.304	.014	.306
9107	May 12	May 15	d	1	.1*.3	237.6	220.	17.6	30.8	27.2	32.	7.4	6.9	.5	3.72	.4	.272	.128	.784	.528	.256	.01	.11
9130	June 11	June 13	d	1	.1*.3	272.8	251.6	21.2	47.2	43.2	39.	9.7	7.7	2.	4.8	.672	.336	.336	1.392	.72	.67	none	.28
9170	July 8	July 12	d	1	.3	325.2	288.4	36.8	26.	19.2	45.5	11.4	9.7	1.7	4.8	.464	.288	.176	1.104	.56	.544	"	.44
9208	" 22	" 24	d	1	.02	260.4	238.4	22.	16.	12.8	39.5	9.3	7.5	1.8	4.96	.4	.256	.144	1.168	.528	.64	.001	.12
9223	" 29	" 30	d	c	.04	296.	236.4	59.6	26.4	10.4	42.	13.4	11.9	1.5	5.6	.48	.24	.24	1.104	.536	.568	.01	.11
9273	Aug. 5	Aug. 6	d	1	.04	241.2	220.8	20.4	12.8	9.2	40.5	8.3	6.8	1.5	4.	.336	.304	.032	1.072	.608	.464	.011	.109
9293	" 12	" 13	d	c	.05	289.6	277.2	12.4	33.6	28.	55.	11.5	8.6	2.9	6.	.56	.256	.304	1.008	.528	.48	.5	.66
9308	" 19	" 20	d	c	.02	315.	274.	41.	22.	28.4	52.	11.8	8.8	3.	6.4	.448	.304	.144	.912	.64	.272	.001	.079
9324	" 26	" 27	d	c	.04	300.4	267.2	33.2	27.2	19.6	53.	10.	7.8	2.2	6.7	.352	.24	.112	.816	.496	.32	.009	.16
9349	Sept. 2	Sept. 3	d	1	.03	224.4	205.6	18.8	11.2	11.2	34.	7.9	7.	.9	3.84	.4	.256	.144	.688	.528	.16	.012	.108
9482	" 9	Oct. 15	d	c	.04	238.4	218.	20.4	16.8	9.6	41.8	11.7	7.8	3.9	3.2	.224	.144	.08	.....	.....	.....	.24	1.52
9379	" 16	Sept. 17	d	c	.1	268.4	237.2	31.2	17.2	16.4	35.	10.9	8.3	2.6	3.44	.336	.176	.16	.....	.....	.....	.07	.17
9398	" 23	" 24	d	1	.04	247.2	232.8	14.4	20.4	16.4	38.	7.9	6.8	1.1	4.	.336	.256	.08	.....	.....	.....	.065	.175
9420	" 30	Oct. 1	d	c	.02	231.6	202.4	29.2	22.4	20.8	31.5	9.9	7.6	2.3	3.36	.368	.224	.144	.....	.....	.....	.12	.24

*Not filtered

The odor was uniformly gassy or musty. The color upon ignition was either dark gray or brown.

CHEMICAL EXAMINATION OF WATER FROM THE DESPLAINES RIVER AT JOLIET.—East Side.—CONTINUED.
(Parts per 1,000,000.)

Serial Number.	1901 Date of		Appearance.			Residue on Evaporation.					Chlorine.	Oxygen Consumed.			Nitrogen as Ammonia				Organic Nitrogen.			Nitrogen as	
	Collection.	Examination.	Turbidity.	Sediment.	Color.	Total.	Dissolved.	Suspended.	Loss on Ignition. Total.	Loss on Ignition. Dissolved.		Total.	By Dissolved.	By Suspended Matt'r	Free Ammonia.	Albuminoid Ammonia. Total.	Albuminoid Ammonia. Dissolved.	Albuminoid Ammonia. Suspended	Total.	Dissolved.	Suspended	Nitrites.	Nitrates.
9420	Sept.30	Oct. 1	d	c	.02	231.6	202.4	29.2	22.4	20.8	31.5	9.9	7.6	2.3	3.36	.368	.224	.144	……	……	……	.12	.24
9442	Oct. 7	" 8	d	c	.03	272.4	247.6	24.8	16.	16.	45.	9.2	7.6	1.6	5.6	.596	.32	.276	……	……	……	.024	.136
9479	" 14	" 15	d	c	.05	258.4	246.8	11.6	18.4	15.2	47.5	13.3	8.8	4.5	5.28	.512	.288	.304	……	……	……	.015	.065
9549	" 21	" 22	d	c	.04	228.	215.6	12.4	28.	14.	34.	8.2	6.2	2.	3.52	.384	.208	.176	……	……	……	.035	.125
9593	" 28	" 28	d	c	.04	227.	208.	19.6	24.8	18.8	35.	7.7	6.5	1.2	4.	.48	.288	.192	……	……	……	.03	.17
9662	Nov. 4	Nov. 4	d	c	.04	186.	164.8	21.2	23.2	19.6	13.	8.	6.1	1.9	1.344	.448	.192	.256	……	……	……	.03	.21
9720	" 11	" 12	d	l	……	196.8	189.2	7.6	35.2	36.8	26.	8.	6.	2.	2.88	.352	.192	.16	……	……	……	.03	.13
9808	" 18	" 19	d	l	.03	221.2	196.8	24.4	23.2	13.6	33.	9.3	5.6	3.7	3.2	.4	.192	.208	……	……	……	.02	.22
9877	" 25	" 26	d	l	.01	220.4	190.4	30.	28.4	23.2	35.	7.9	5.2	.7	3.52	.576	.224	.352	……	……	……	.017	.223
9950	Dec. 2	Dec. 3	d	l	01*.1	205.6	181.6	24.	20.	19.2	24.	7.9	6.4	1.5	3.36	.336	.288	.048	……	……	……	.017	.223
10030	" 9	" 10	d	l	.05	202.	183.2	18.8	22.8	10.4	22.	8.3	5.4	2.9	2.56	.352	.224	.128	……	……	……	.015	.225
10102	" 16	" 17	d	l	.03	307.6	299.6	8.	31.2	25.6	59.	10.2	6.6	3.6	7.2	.48	.272	.208	……	……	……	.03	.44
10132	" 23	" 24	d	c	.01	277.6	201.2	76.4	32.	18.	23.	14.8	9.2	5.6	3.2	.72	.288	.432	……	……	……	.02	.58
10154	" 30	" 31	d	c	.05	205.6	203.2	2.4	19.2	14.4	21.	10.4	6.4	4.	2.88	.56	.24	.32	……	……	……	.012	.228
Average Jan. 22—June 11…………						232.5	209.	23.5	28.6	26.1	21.9	9.6	7.3	2.3	2.436	.514	.29	.224	1.114	.589	.525	.015	.387
Average July 8—Dec. 30……………						252.4	226.9	25.5	23.1	18.1	37.5	9.9	7.5	2.4	4.274	.441	.247	.194	.921	.545	.376	.05	.262
Average Jan. 22—Dec. 30…………						242.4	218.	24.4	25.8	22.1	29.7	9.7	7.4	2.3	3.355	.478	.269	.209	1.05	.574	.476	.031	.324

*Not Filtered.

The odor was uniformly gassy or musty. The color upon ignition was either dark gray or brown.

CHEMICAL EXAMINATION OF WATER FROM THE DESPLAINES RIVER AT JOLIET.—West Side.
(Parts per 1,000,000.)

Serial Number.	1901 Date of Collection.	1901 Date of Examination.	Appearance. Turbidity.	Appearance. Sediment.	Appearance. Color.	Residue on Evaporation. Total.	Residue on Evaporation. Dissolved.	Residue on Evaporation. Suspended.	Residue on Evaporation. Loss on Ignition. Total.	Residue on Evaporation. Loss on Ignition. Dissolved.	Chlorine.	Oxygen Consumed. Total.	Oxygen Consumed. By Dissolved.	Oxygen Consumed. By Suspended Matt'r	Nitrogen as Ammonia. Free Ammonia.	Nitrogen as Ammonia. Albuminoid Ammonia. Total.	Nitrogen as Ammonia. Albuminoid Ammonia. Dissolved.	Nitrogen as Ammonia. Albuminoid Ammonia. Suspended	Organic Nitrogen. Total.	Organic Nitrogen. Dissolved.	Organic Nitrogen. Suspended	Nitrogen as Nitrites.	Nitrogen as Nitrates.
8963	Jan. 22	Jan. 23	d	l	.05	218.4	195.6	22.8	14.	9.2	17.	7.5	5.5	2.	1.6	.464	.24	.224	1.036	.528	.508	.017	.183
9007	Feb. 20	Feb. 21	d	l	.2*.3	197.6	185.6	12.	27.6	16.4	15.	7.5	6.	1.5	1.328	.416	.208	.208	.848	.56	.288	.007	.273
9036	Mar. 15	Mar. 18	d	c	.7	207.2	144.8	62.4	35.6	24.	7.8	15.	11.6	3.4	.704	.624	.384	.24	1.488	.752	.736	.022	.978
9070	Apr. 14	Apr. 17	d	l	.01	233.2	210.4	23.2	24.	36.8	13.	9.7	7.3	2.4	1.168	.272	.176	.096	.688	.368	.32	.015	.305
9108	May 12	May 15	d	l	.09*.2	184.8	174.	10.8	31.2	30.4	10.	6.3	5.7	.6	1.472	.288	.192	.096	.704	.496	.208	.02	.14
9131	June 11	June 13	d	l	.1*.2	213.6	190.4	23.2	48.	42.8	14.	9.2	6.9	2.3	1.536	.288	.24	.048	.976	.608	.368	.048	.152
9169	July 8	July 12	d	l	.1	253.6	226.	27.6	28.	26.4	16.	8.7	7.5	1.2	1.44	.272	.256	.016	.752	.432	.32	.06	.1
9211	" 22	" 24	d	l	.01	264.4	233.2	31.2	44.	24.8	33.	8.3	6.5	1.8	3.92	.336	.192	.144	.944	.592	.352	.015	.12
9221	" 29	" 30	d	l	.01	199.6	173.2	26.4	20.8	18.4	12.	10.	9.2	.8	1.66	.4	.192	.208	.656	.4	.256	.015	.065
9274	Aug. 5	Aug. 6	d	l	.04	285.6	260.8	24.8	26.4	22.8	55.	9.1	7.2	1.9	6.08	.544	.336	.208	1.104	.624	.48	.017	.063
9294	" 12	" 13	d	c	.03	187.2	170.8	16.4	39.6	35.2	12.	8.4	7.	1.4	1.6	.32	.224	.096	.624	.336	.288	.04	.2
9309	" 19	" 20	d	l	.02*.02	181.2	166.	15.2	64.4	52.	12.5	8.5	6.6	1.9	1.68	.304	.224	.08	.592	.464	.128	.002	.078
9325	" 26	" 27	d	c	.04	242.4	197.2	45.2	24.4	22.4	15.	9.4	6.4	3.	2.	.32	.224	.096	.816	.432	.384	.03	.09
9346	Sept. 2	Sept. 3	d	l	.02	170.8	163.2	7.6	18.4	18.	11.5	7.4	6.2	1.2	1.408	.288	.208	.08	.528	.384	.144	.032	.048
9483	" 9	Oct. 15	d	l	.04*.04	164.	159.	5.	12.4	12.8	10.3	7.1	4.8	2.3	.032	.128	.096	.032	....	....	....	.003	1.317
9380	" 16	Sept. 17	d	l	.1	188.	171.2	16.8	13.6	12.	10.	7.4	7.2	.2	1.056	.16	.144	.016	....	....	....	.125	.235
9400	" 23	" 24	d	l	.01	173.6	159.6	14.	41.2	20.	10.	5.4	5.4	....	1.12	.256	.16	.096	....	....	....	.11	.17
9419	" 30	Oct. 1	d	l	.01	188.8	173.2	15.6	16.4	20.	11.	7.3	6.7	.6	1.28	.272	.176	.096	....	....	....	.065	.255

*Not filtered.

CHEMICAL EXAMINATION OF WATER FROM THE DESPLAINES RIVER AT JOLIET.—West Side.—CONTINUED.
(Parts Per 1,000,000.)

Serial Number.	1901 Date of Collection.	1901 Date of Examination.	Appearance. Turbidity.	Appearance. Sediment.	Appearance. Color.	Residue on Evaporation. Total.	Residue on Evaporation. Dissolved.	Residue on Evaporation. Suspended.	Loss on Ignition. Total.	Loss on Ignition. Dissolved.	Chlorine.	Oxygen Consumed. Total.	Oxygen Consumed. By Dissolved.	Oxygen Consumed. By Suspended Matt'r	Nitrogen as Ammonia. Free Ammonia.	Albuminoid Ammonia. Total.	Albuminoid Ammonia. Dissolved.	Albuminoid Ammonia. Suspended	Organic Nitrogen. Total.	Organic Nitrogen. Dissolved.	Organic Nitrogen. Suspended	Nitrogen as Nitrites.	Nitrogen as Nitrates.
9441	Oct. 7	Oct. 8	d	l	.03	184.4	179.2	5.2	16.	16.	13.	7.3	7.3	...	1.6	.304	.144	.16	....			.065	.135
9477	" 14	" 15	d	l	.04	188.8	169.6	19.	14.8	12.	12.5	8.5	5.9	2.6	2.4	.32	.208	.112	....			.064	.176
9548	" 21	" 22	d	c	.04	182.8	152.	30.8	17.6	17.6	10.	6.	5.9	.1	.896	.208	.128	.08	....			.06	.06
9592	" 28	" 28	d	l	.03	180.4	153.2	27.2	35.2	21.2	11.	6.3	5.1	1.2	1.28	.272	.144	.138	....			.06	.14
9663	Nov. 4	Nov. 5	d	c	.03	172.8	164.4	8.4	28.	23.2	13.	7.1	5.6	1.5	1.184	.32	.224	.096	....			.034	.166
9807	" 18	" 19	d	l	.03	166.4	146.	20.4	16.8	14.	9.	6.1	4.3	1.8	.656	.308	.128	.18	....			.03	.21
9876	" 25	" 26	d	l	.01	167.6	157.2	9.4	21.6	30.4	12.	5.4	3.7	1.7	.8	.24	.128	.112	....			.025	.135
9951	Dec. 2	Dec. 3	d	l	05*.1	188.	171.6	17.4	16.8	21.6	20.	6.7	4.4	2.3	2.72	.32	.256	.064	....			.019	.141
10028	" 9	" 10	d	l	.03	188.4	174.4	14.	19.2	14.8	21.	6.6	4.6	2.	2.72	.32	.192	.128	....			.015	.305
10101	" 16	" 17	d	c	.01	251.2	220.	31.2	30.	26.4	32.	15.6	5.8	9.8	4.48	.72	.288	.432	....			.05	.36
10133	" 23	" 24	d	c	.01	314.	194.8	119.2	19.6	22.4	22.	10.8	8.8	2.	2.88	.4	.224	.176	....			.016	.464
10155	" 30	" 31	d	c	.05	200.4	196.	4.4	17.6	18.	21.	10.9	7.	3.9	3.04	.56	.288	.272	....			.013	.227
Average Jan. 22—June 11						209.2	183.4	15.8	30.1	26.6	12.8	9.2	7.1	2.1	1.301	.392	.24	.152	.956	.552	.404	.021	.338
Average July 8—Dec. 30						203.5	181.	22.5	25.6	22.1	16.7	8.	6.2	1.8	1.958	.326	.197	.129	.698	.44	.258	.038	.199
Average Jan. 22—Dec. 30						206.3	182.2	24.1	27.8	24.3	14.7	8.6	6.7	1.9	1.629	.359	.218	.141	.871	.515	.356	.03	.268

*Not Filtered.

The odor was uniformly gassy or musty. The color upon ignition was either dark gray or brown.

CHEMICAL EXAMINATION OF WATER FROM THE ILLINOIS RIVER AT AVERYVILLE.
(Parts Per 1,000,000.)

Serial Number.	1901 Date of Collection.	1901 Date of Examination.	Appearance. Turbidity.	Appearance. Sediment.	Appearance. Color.	Residue on Evaporation. Total.	Residue on Evaporation. Dissolved.	Residue on Evaporation. Suspended.	Loss on Ignition. Total.	Loss on Ignition. Dissolved.	Chlorine.	Oxygen Consumed. Total.	Oxygen Consumed. By Dissolved.	Oxygen Consumed. By Suspended Matt'r	Nitrogen as Ammonia. Free Ammonia.	Albuminoid Ammonia. Total.	Albuminoid Ammonia. Dissolved.	Albuminoid Ammonia. Suspended	Organic Nitrogen. Total.	Organic Nitrogen. Dissolved.	Organic Nitrogen. Suspended	Nitrogen as Nitrites.	Nitrogen as Nitrates.
8937	Jan. 2	Jan. 3	d	l	.05	255.2	243.6	11.6	16.8	12.8	18.	7.5	7.5	...	1.52	.16	.144	.016	.656	.528	.128	.014	.786
8975	Feb. 1	Feb. 2	d	l	.04	246.4	240.8	5.6	22.8	18.4	12.	7.5	7.4	.1	1.008	.208	.192	.016	.72	.656	.064	.009	1.351
9018	Mar. 1	Mar. 2	s	l	3*.4	232.8	230.8	2.	10.4	6.8	14.	5.9	5.9	...	1.536	.24	.224	.016	.56	.528	.032	.007	.513
9056	Apr. 1	Apr. 2	d	c	.5	252.4	231.6	20.8	36.	36.	5.4	11.8	8.9	2.9	.272	.272	.224	.048	.72	.592	.128	.032	2.688
9098	May 2	May 2	d	l	5*.3	267.6	256.4	11.2	41.2	40.4	8.8	9.2	8.5	.7	.144	.4	.256	.144	.912	.752	.16	.025	1.215
9124	June 1	June 1	d	c	.1	308.4	296.4	12.	34.8	31.2	16.	10.9	7.4	3.5	.32	.288	.192	.096	.912	.528	.384	.085	1.04
9157	July 3	July 3	d	c	.01	300.8	252.	48.8	20.	15.6	21.	8.5	6.3	2.2	.176	.208	.16	.048	.688	.544	.144	.24	1.36
9184	" 17	" 17	d	c	.1	324.	284.	40.	33.2	34.	23.	9.1	8.5	.6	.16	.288	.224	.064	1.04	.672	.368	.15	1.57
9216	" 26	" 27	d	l	.01	270.	233.6	36.4	24.	16.4	24.	9.2	8.3	.9	.136	.24	.192	.048	.656	.528	.128	.15	.93
9232	" 30	" 30	d	l	.04	251.2	216.8	34.4	13.6	12.8	26.	7.7	6.7	1.	.224	.224	.192	.032	.688	.668	.08	.18	1.26
9283	Aug. 6	Aug. 7	d	c	.03	254.	225.6	28.4	32.	31.6	26.	7.3	7.1	.2	.32	.288	.272	.016	.688	.528	.16	.272	1.725
9296	" 13	" 13	d	c	.05	253.6	215.2	38.4	29.2	49.2	25.	8.5	7.8	.7	.144	.256	.224	.032	.624	.528	.096	.17	1.67
9316	" 20	" 20	d	c	.01	237.2	207.6	29.6	16.4	4.4	22.5	7.3	5.8	1.5	.144	.24	.224	.016	.56	.528	.032	.18	1.54
9332	" 27	" 27	d	c	.04	232.4	214.4	18.	22.4	22.4	22.	6.9	5.5	1.4	.152	.224	.192	.032	.592	.496	.096	.2	1.44
9345	Sept. 2	Sept. 3	d	c	.02	260.	203.6	56.4	38.4	26.8	24.	7.2	5.8	1.4	.192	.224	.16	.064	.592	.528	.064	.22	1.46
9366	" 10	" 12	d	c	.01	249.2	217.6	31.6	29.4	26.	23.5	6.	4.9	1.1	.128	.224	.16	.064	.....	.....	.....	.15	1.49
9386	" 17	" 17	d	l	.02	234.	210.8	23.2	30.4	29.2	21.	6.	5.4	.6	.16	.208	.208	....	.....	.....	.....	.19	1.49
9405	" 24	" 25	d	c	.02	248.4	236.	12.4	30.	29.2	28.	6.9	5.9	1.	.56	.256	.16	.096	.....	.....	.....	.2	1.6
9422	Oct. 1	Oct. 1	d	l	.02	240.4	209.2	31.2	....	22.8	22.	7.1	6.3	.8	.192	.272	.16	.112	.....	.....	.....	.08	1.52
9448	" 8	" 8	d	l	.05	233.6	218.8	14.8	12.8	13.6	23.	6.9	6.7	.2	.156	.224	.176	.048	.....	.....	.....	.15	1.45

*Not filtered.

CHEMICAL EXAMINATION OF WATER FROM THE ILLINOIS RIVER AT AVERYVILLE.— CONTINUED.
(Parts per 1,000,000.)

Serial Number.	1901 Date of Collection.	1901 Date of Examination.	Appearance. Turbidity.	Appearance. Sediment.	Appearance. Color.	Residue on Evaporation. Total.	Residue on Evaporation. Dissolved.	Residue on Evaporation. Suspended.	Loss on Ignition. Total.	Loss on Ignition. Dis-solved.	Chlorine.	Oxygen Consumed. Total.	Oxygen Consumed. By Dis-solved.	Oxygen Consumed. By Suspended Matt'r	Nitrogen as Ammonia. Free Ammonia.	Albuminoid Ammonia. Total.	Albuminoid Ammonia. Dis-solved.	Albuminoid Ammonia. Sus-pended	Organic Nitrogen. Total.	Organic Nitrogen. Dissolved.	Organic Nitrogen. Suspended	Nitrogen as Nitrites.	Nitrogen as Nitrates.
9496	Oct. 16	Oct. 16	d	l	.03	226.	219.6	6.4	19.6	16.4	22.	5.8	5.	.8	.096	.208	.192	.016	....	....	....	.12	1.84
9559	" 23	" 23	d	l	.04	227.6	214.	3.6	28.	26.4	24.	5.3	5.2	.1	.272	.24	.192	.048	....	....	....	.125	1.675
9613	" 30	" 30	d	l	.05	230.	202.8	27.2	26.	31.2	22.	5.8	4.8	1.	.16	.224	.192	.032	....	....	....	.105	1.735
9673	Nov. 6	Nov. 6	d	l	.03*.1	194.8	190.4	4.4	13.2	12.	20.	5.	4.4	.6	.08	.224	....		....	....	....	.105	1.735
9735	" 13	" 13	d	c	.04	218.4	218.4	....	22.4	16.	21.	5.5	5.3	.2	.56	.224	.224	....	....	....	....	.075	1.805
9812	" 20	" 20	d	l	.04*.1	214.	204.	10.	29.6	10.8	21.	5.4	5.	.4	.32	.208	.16	.048	....	....	....	.085	1.775
9884	" 27	" 27	d	l	.01*.2	210.4	201.2	9.2	27.2	27.2	22.	5.6	4.7	.9	.992	.24	.144	.096	....	....	....	.05	1.15
9969	Dec. 4	Dec. 4	d	l	.....	222.4	216.4	6.	24.4	42.4	20.	6.1	4.6	1.5	1.152	.256	.224	.032	....	....	....	.035	1.245
10047	" 11	" 11	d	l	.03	194.8	193.6	1.2	21.6	27.2	20.	5.4	5.3	.1	1.344	.224	.176	.048	....	....	....	.045	.955
10106	" 18	" 18	d	v l	.01*.04	230.4	213.2	17.2	26.8	23.2	22.	5.5	5.	.5	1.76	.224	.16	.064	....	....	....	.022	.338
10141	" 26	" 26	d	v l	.03*.1	498.8	245.2	253.6	50.	21.6	24.	7.2	7.	.2	2.48	.272	.256	.016	....	....	....	.018	.742
Average Jan. 2—June 1...........						260.4	249.9	10.5	27.	24.4	12.3	8.8	7.6	1.2	.8	.261	.205	.056	.746	.597	.149	.028	1.265
Average July 3—Dec. 26..........						250.6	219.7	30.9	25.8	23.6	22.7	6.7	5.8	.9	.495	.233	.159	.074	.658	.534	.124	.133	1.409
Average Jan. 2—Dec.26...........						255.5	234.8	20.7	26.4	23.9	17.5	7.7	6.7	1.	.647	.249	.198	.051	.717	.576	.141	.081	1.337

*Not filtered.

CHEMICAL EXAMINATION OF WATER FROM THE ILLINOIS RIVER AT KAMPSVILLE.
(Parts per 1,000,000.)

Serial Number.	1901 Date of		Appearance.			Residue on Evaporation.					Chlorine.	Oxygen Consumed.			Nitrogen as Ammonia				Organic Nitrogen.			Nitrogen as	
	Collection.	Examination.	Turbidity.	Sediment.	Color.	Total.	Dissolved.	Suspended.	Loss on Ignition. Total.	Loss on Ignition. Dissolved.		Total.	By Dissolved.	By Suspended Matt'r	Free Ammonia.	Albuminoid Ammonia. Total.	Albuminoid Ammonia. Dissolved.	Albuminoid Ammonia. Suspended	Total.	Dissolved.	Suspended	Nitrites.	Nitrates.
8944	Jan. 7	Jan. 8	d	l	.1*.5	270.4	269.2	1.2	15.2	13.6	14.	8.	8.9	......	.784	.32	.256	.064	1.172	.56	.612	.012	1.228
8961	" 21	" 22	d	c	.....	295.2	245.2	50.	19.2	18.	11.	8.3	7.4	.9	.72	.32	.272	.048	.944	.816	.128	.016	1.344
8974	" 28	" 29	d	l	.05	289.6	238.8	50.8	18.	16.4	10.	8.	7.3	.7	.64	.304	.24	.064	.816	.596	.22	.016	1.624
8990	Feb. 11	Feb. 12	d	l	.1	258.8	253.6	5.2	13.6	16.	13.	7.	6.5	.5	.744	.272	.256	.016	.544	.528	.016	.01	1.27
8999	" 18	" 19	d	c	.1	805.2	246.4	558.8	15.2	14.	11.	7.2	6.8	.4	.992	.272	.24	.032	.944	.624	.32	.01	.99
9016	" 25	" 27	d	c	.2	264.4	230.4	34.	20.4	13.2	12.	10.6	9.	1.6	.8	.256	.224	.032	.816	.592	.224	.009	.711
9024	Mar. 4	Mar. 6	d	l	.2	258.4	233.2	25.2	31.6	28.	12.	8.1	7.7	.4	1.168	.288	.24	.048	.864	.688	.176	.011	.749
9027	" 12	" 13	v d	v m	.3	1919.6	160.4	1759.2	63.2	23.2	6.6	28.6	11.8	16.8	.608	1.568	.544	1.024	3.504	.56	2.444	.008	.752
9040	" 18	" 19	v d	v m	.2	787.2	168.8	618.4	30.4	14.	6.7	26.1	9.8	16.3	.56	.8	.24	.56	1.744	.464	1.28	.011	1.269
9046	" 25	" 26	v d	v m	.3	561.6	180.	381.6	27.2	17.2	4.8	15.2	8.3	6.9	.4	.48	.16	.32	1.36	.592	.768	.015	1.425
9065	April 8	April 10	d	m	.4	265.	216.	49.	32.	22.2	5.7	11.8	8.8	3.	.208	.304	.192	.112	.752	.544	.208	.03	2.53
9069	" 15	" 16	d	m	.2	318.8	227.6	91.2	34.4	32.4	5.1	10.7	8.6	2.1	.096	.288	.224	.064	.976	.752	.224	.028	2.692
9082	" 23	" 24	d	c	.15	297.2	243.6	53.6	42.4	42.	5.6	11.5	10.3	1.2	.072	.304	.208	.096	.976	.576	.4	.015	1.745
9087	" 29	" 30	d	c	....	344.	250.	94.	45.2	42.4	6.7	10.3	8.5	1.8	.128	.448	.256	.192	1.104	.496	.608	.014	1.226
9101	May 7	May 8	d	c	.2	464.	260.	204.	50.	35.2	7.7	13.3	8.9	4.4	.096	.416	.256	.16	1.136	.512	.624	.022	.818
9106	" 13	" 14	d	c	....	467.6	265.6	202.	56.8	35.6	9.6	15.1	9.1	6.	.112	.416	.256	.16	1.104	.592	.512	.044	.796
9117	" 20	" 21	d	m	....	462.	263.6	198.4	45.6	35.6	11.	12.9	7.8	5.1	.128	.416	.224	.192	1.168	.592	.576	.032	.688
9129	June 10	June 11	v d	m	....	428.8	254.	174.8	70.4	46.	12.	12.5	10.3	2.2	.144	.368	.304	.064	1.008	.72	.288	.052	.908
9136	" 17	" 19	d	c	.05	422.8	256.4	166.4	55.2	46.	14.	9.9	5.9	4.	.064	.336	.224	.112	.88	.592	.288	.046	1.434
9145	" 24	" 25	d	c	.1	355.2	260.4	94.8	36.8	....	14.5	9.	6.2	2.8	.08	.24	.176	.064	.944	.596	.348	.065	.055
9155	July 1	July 2	d	c	.01	345.6	248.4	97.2	28.8	23.6	15.	8.9	6.2	2.7	.056	.272	.224	.048	.816	.544	.72	.05	1.43
9165	" 8	" 9	d	c	.1	352.	248.	104.	45.2	43.2	12.	10.	6.3	3.7	.096	.304	.256	.048	.752	.608	.144	.05	1.31
9185	" 15	" 17	d	l	.1	312.	279.2	32.8	28.8	28.	17.	7.4	7.1	.3	.108	.224	.208	.016	.64	.608	.032	.07	1.53
9206	" 22	" 23	d	l	.05	278.4	256.8	21.6	19.2	20.	20.	7.	6.7	.3	.108	.224	.172	.052	.624	.592	.032	.8	.6
9233	" 29	" 30	d	l	.05	290.8	254.4	36.4	28.8	22.8	20.	7.6	7.5	.1	.097	.272	.256	.016	.608	.528	.08	.06	.86
9295	Aug. 12	Aug. 13	d	c	.05	256.	236.	20.	28.8	24.8	23.5	8.4	7.5	.9	.128	.272	.224	.048	.592	.48	.112	.105	1.135
9344	Sept. 2	Sept. 3	d	c	.03	263.6	227.6	36.	31.6	30.	22.	6.7	5.6	1.1	.12	.192	.128	.064	.56	.368	.192	.1	.11

*Not filtered.

CHEMICAL EXAMINATION OF WATER FROM THE ILLINOIS RIVER AT KAMPSVILLE.—CONTINUED.
(Parts per 1,000,000.)

Serial Number.	1901 Date of		Appearance.			Residue on Evaporation.					Chlorine.	Oxygen Consumed.			Nitrogen as Ammonia				Organic Nitrogen.			Nitrogen as	
	Collection.	Examination.	Turbidity.	Sediment.	Color.	Total.	Dissolved.	Suspended.	Loss on Ignition. Total.	Loss on Ignition. Dissolved.		Total.	By Dissolved.	By Suspended Matt'r	Free Ammonia.	Albuminoid Ammonia. Total.	Albuminoid Ammonia. Dissolved.	Albuminoid Ammonia. Suspended	Total.	Dissolved.	Suspended	Nitrites.	Nitrates.
9363	Sept. 9	Sept. 10	d	c	.02	261.6	218.8	42.8	28.8	26.	21.	6.2	6.	.2	.162	.256	.224	.032	.624	.512	.112	.11	1.13
9385	" 16	" 17	d	c	.03	283.2	239.6	43.6	36.8	26.4	22.	6.4	5.6	.8	.224	.208	.192	.016	....	....	....	.06	1.34
9404	" 23	" 24	d	c	.02	259.2	216.4	42.8	26.4	16.	21.	6.3	6.	.3	.192	.16	.144	.016	....	....	....	.075	1.525
9423	" 30	Oct. 1	d	c	.02	234.8	212.8	22.	11.2	10.8	23.	6.7	6.	.7	.128	.24	.16	.08	....		....	.07	1.57
9449	Oct. 7	" 8	d	c	.1	258.4	232.8	25.6	21.6	26.	27.	7.3	7.	.3	.112	.208	.188	.02	....		....	.09	1.67
9484	" 14	" 15	d	c	.05	240.	219.6	20.4	12.8	12.8	20.	7.4	5.6	1.8	.132	.208	.16	.048	....		....	.055	1.01
9553	" 21	" 22	d	c	.04	250.4	218.	32.4	34.8	19.6	22.	5.5	5.4	.1	.16	.224	.192	.032	....		....	.09	1.31
9631	" 28	" 31	d	c	.03	242.8	170.	72.	13.	13.2	22.	7.3	4.9	2.4	.136	.288	.176	.112	....		....	.035	1.045
9669	Nov. 4	Nov. 5	d	c	.04	242.8	239.8	3.	30.4	29.2	23.	6.2	5.5	.7	.152	.288	.16	.128	....		....	.07	1.57
9725	" 11	" 12	d	l	.04	242.8	223.2	19.6	25.6	21.6	20.	7.1	5.5	1.6	.08	.32	.192	.128	....		....	.055	1.625
9809	" 18	" 19	d	c	.05	222.4	210.8	11.6	45.6	26.4	20.	7.1	5.7	1.4	.1	.48	.128	.352	....		....	.055	1.185
9879	" 25	" 26	d	l	....	237.2	224.8	12.4	34.	26.8	21.	6.5	4.6	1.9	.328	.384	.16	.224	....		....	.045	1.755
9954	Dec. 2	Dec. 3	s	l	.02	228.8	228.	.8	24.4	28.	21.	7.6	6.8	.8	.504	.32	.192	.128	....		....	.05	1.71
10032	" 6	" 10	d	l	.05	214.4	211.2	3.2	23.6	22.8	19.	6.8	5.8	1.	.832	.288	.16	.128	....		....	.03	1.03
10107	" 17	" 18	d	l	.01*.05	230.4	226.	4.4	35.6	26.8	19.	6.3	5.6	.7	1.12	.288	.176	.112	....		....	.034	.966
10131	" 23	" 24	d	l	.02*.15	239.6	237.2	2.4	20.	19.6	22.	7.7	7.7	...	1.44	.24	.224	.016	....		....	.032	1.168
10152	" 30	" 31	d	l	.05*.1	240.	236.	4.	6.4	22.4	23.	7.7	7.7	...	1.44	.288	.192	.096	....		....	.02	.88
Average Jan. 7—June 24						476.4	236.1	240.6	35.6	27.4	9.6	12.2	8.4	3.8	.427	.421	.249	.172	1.137	.599	.538	.023	1.212
Average July 1—Dec. 30............						262.2	230.3	31.9	24.9	25.5	20.5	7.1	6.2	.9	.331	.267	.191	.076	.652	.53	.122	.092	1.227
Average Jan. 7—Dec.30						359.7	232.9	126.8	29.8	26.1	15.6	9.4	7.2	2.2	.375	.338	.218	.12	.999	.579	.42	.061	1.221

*Not Filtered.

CHEMICAL EXAMINATION OF WATER FROM THE ILLINOIS RIVER AT GRAFTON.

(Parts per 1,000,000.)

Serial Number.	1901. Date of Collection.	1901. Date of Examination.	Appearance. Turbidity.	Appearance. Sediment.	Appearance. Color.	Residue on Evaporation. Total.	Residue on Evaporation. Dissolved.	Residue on Evaporation. Suspended.	Loss on Ignition. Total.	Loss on Ignition. Dissolved.	Chlorine.	Oxygen Consumed. Total.	Oxygen Consumed. By Dissolved.	Oxygen Consumed. By Suspended Matt'r	Nitrogen as Ammonia. Free Ammonia.	Albuminoid Ammonia. Total.	Albuminoid Ammonia. Dissolved.	Albuminoid Ammonia. Suspended	Organic Nitrogen. Total.	Organic Nitrogen. Dissolved.	Organic Nitrogen. Suspended	Nitrogen as Nitrites.	Nitrogen as Nitrates.
9005	Feb. 21	Feb. 22	v d	c	.3	464.4	228.4	236.	32.8	23.2	10.	13.1	6.9	6.2	.72	.48	.272	.208	1.296	.56	.736	.012	.828
9037	Mar. 15	Mar. 19	v d	v m	.4	789.2	156.4	632.8	50.	11.6	5.4	28.4	11.8	16.6	.56	1.152	.304	.848	2.384	.624	1.76	.016	1.184
9079	Apr. 21	Apr. 23	d	c	.4	361.2	109.2	252.	56.	46.4	4.8	12.4	10.3	2.1	.08	.516	.224	.292	.976	.624	.342	.014	1.626
9115	May 20	May 21	d	c	...	402.4	260.8	141.6	55.2	42.	10.	12.7	8.7	4.	.064	.32	.208	.112	1.04	.592	.448	.04	.76
9147	June 25	June 26	d	c	.2	324.8	248.	76.8	54.8	38.	13.	9.3	6.9	2.4	.048	.256	.224	.022	.672	.464	.208	.025	1.015
9179	July 15	July 16	d	c	.1	302.4	248.8	53.6	30.	33.6	13.	8.7	7.2	1.5	.032	.256	.16	.096	.688	.592	.096	.024	1.176
9197	" 22	" 23	d	l	.04	360.	266.	94.	22.4	28.	19.	7.6	6.8	.8	.158	.288	.256	.032	.656	.512	.144	.036	1.324
9230	" 29	" 30	d	c	.5	267.2	219.2	48.	29.2	28.	15.	10.1	....	....	.13	.272	.224	.048	.608	.544	.064	.021	.619
2275	Aug. 5	Aug. 6	d	l	.1	263.2	212.4	50.8	35.2	34.8	17.	8.4	7.7	.7	.064	.304	.288	.016	.72	.64	.08	.025	5.975
9299	" 14	" 15	d	c	.1	292.8	231.6	61.2	52.4	44.	22.	8.6	7.2	1.4	.064	.304	.24	.064	.688	.528	.16	.05	1.19
9312	" 19	" 20	d	c	.05	284.4	239.6	44.8	33.2	33.2	21.	7.2	6.8	.4	.106	.224	.208	.016	.528	.512	.016	.075	.845
9321	" 26	" 27	d	c	.05	274.8	220.4	54.4	29.6	28.8	22.	7.9	7.8	.1	.108	.272	.192	.08	.688	.496	.192	.05	.87
9351	Sept. 2	Sept. 4	d	c	.04	277.2	217.6	59.6	21.2	16.8	20.	7.	5.7	1.3	.114	.24	.192	.048	.592	.432	.16	.07	1.21
9361	" 9	" 10	d	c	.01	264.4	218.	46.4	18.8	14.	20.	6.1	5.2	.9	.076	.192	.176	.016	.528	.512	.016	.055	1.025
9384	" 16	" 17	d	c	.02	270.8	218.4	52.4	33.2	20.	21.	7.1	6.3	.8	.112	.224	.16	.064	.....	.....	.....	.06	.06
9401	" 23	" 24	d	c	.02	256.8	222.	34.8	36.8	28.4	20.5	6.2	5.7	.5	.171	.24	.128	.112	.....	.....	.....	.06	.15
9416	" 30	Oct. 1	d	c	.03	260.4	214.4	46.	36.	24.	21.	6.3	5.6	.7	.056	.208	.144	.064	.....	.....	.....	.04	1.68

CHEMICAL EXAMINATION OF WATER FROM THE ILLINOIS RIVER AT GRAFTON.—CONTINUED.
(Parts per 1,000,000.)

Serial Number.	1901 Date of		Appearance.			Residue on Evaporation.					Chlorine.	Oxygen Consumed.			Nitrogen as Ammonia				Organic Nitrogen.			Nitrogen as	
									Loss on Ignition.						Free Ammonia.	Albuminoid Ammonia.							
	Collection.	Examination.	Turbidity.	Sediment.	Color.	Total.	Dissolved.	Suspended.	Total.	Dissolved.		Total.	By Dissolved.	By Suspended Matt'r		Total.	Dissolved.	Suspended	Total.	Dissolved.	Suspended	Nitrites.	Nitrates.
9446	Oct. 7	Oct. 8	d	c	....	286.	282.	4.	24.	24.	26.	8.2	8.	.2	.046	.192	.144	.048	.....	.....	.....	.065	1.735
9490	" 14	" 15	d	c	.05	274.8	212.	62.8	31.6	22.4	20.5	7.7	6.6	1.1	.164	.224	.224	.....	.....	.....	.....	.035	1.405
9545	" 21	" 22	d	l	.03	243.6	219.2	24.4	18.4	18.4	22.	5.3	5.	.3	.164	.24	.224	.016	.....	.....	.....	.075	1.525
9607	" 28	" 29	d	l	.15	.....	215.6	.....	.....	25.2	47.	6.	5.1	.9	.168	.32	.192	.128	.....	.....	.....	.03	1.61
9675	Nov. 6	Nov. 7	d	c	.05	257.6	224.4	32.2	20.	17.2	23.	7.	5.7	1.3	.068	.288	.256	.032	.....	.....	.....	.05	1.79
9752	" 13	" 14	d	c	.04*.05	247.2	218.4	28.8	30.	30.4	21.	....	5.6	.....	.064	.552	.176	.176	.....	.....	.....	.035	1.405
9796	" 18	" 18	....	....	.06	235.6	220.8	14.8	35.6	30.4	20.4	8.3	5.9	2.4	.052	.56	.192	.368	.....	.....	.....	.05	1.27
9863	" 25	" 26	....	....	.03	244.8	223.6	21.2	38.4	35.2	20.	8.1	5.8	2.3	.064	.448	.176	.272	.....	.....	.....	.05	1.63
9937	Dec. 2	Dec. 3	d	l	.03*.1	223.2	212.4	10.8	28.	21.2	20.	9.2	5.7	3.5	.24	.352	.224	.128	.....	.....	.....	.05	1.75
10020	" 9	" 10	d	l	.03	281.	233.2	47.8	27.2	25.6	19.	7.4	5.9	1.5	.672	.336	.192	.144	.....	.....	.....	.006	.994
10096	" 16	" 17	vd	m	.04	554.	187.6	366.8	45.6	16.	18.	17.5	6.5	11.	.8	.64	.208	.432	.....	.....	.....	.022	.818
10138	" 23	" 25	d	c	.0	255.6	220.8	34.8	56.	44.8	18.	8.9	7.9	1.	1.28	.32	.192	.128	.....	.....	.....	.022	1.018
Average Feb. 21—June 25						468.4	200.5	267.9	49.7	32.2	8.6	15.1	8.9	6.2	.294	.544	.246	.298	1.273	.572	.701	.021	1.082
Average July 15—Dec. 23						281.5	226.	55.5	31.4	27.2	20.9	8.1	6.4	1.7	.204	.303	.236	.067	.623	.521	.102	.043	1.431
Average Feb. 21—Dec. 23						366.4	214.4	152.	39.8	29.5	15.3	11.3	7.5	3.8	.245	.413	.241	.172	1.029	.553	.476	.033	1.273

*Not filtered.

CHEMICAL EXAMINATION OF WATER FROM THE MISSISSIPPI RIVER AT GRAFTON.
(Parts per 1,000,000.)

Serial Number.	1901. Date of Collection	1901. Date of Examination.	Appearance. Turbidity.	Appearance. Sediment.	Appearance. Color.	Residue on Evaporation. Total.	Residue on Evaporation. Dissolved.	Residue on Evaporation. Suspended.	Loss on Ignition. Total.	Loss on Ignition. Dissolved.	Chlorine.	Oxygen Consumed. Total.	Oxygen Consumed. By Dissolved.	Oxygen Consumed. By Suspended Matt'r.	Nitrogen as Ammonia. Free Ammonia.	Albuminoid Ammonia. Total.	Albuminoid Ammonia. Dissolved.	Albuminoid Ammonia. Suspended	Organic Nitrogen. Total.	Organic Nitrogen. Dissolved.	Organic Nitrogen. Suspended	Nitrogen as Nitrites.	Nitrogen as Nitrates.
9004	Feb. 21	Feb. 21	d	1	.4	272.	183.2	88.8	19.6	14.4	4.7	9.9	8.7	1.2	1.	.272	.208	.064	.592	.496	.096	.011	.709
9038	Mar. 15	Mar. 19	v d	v m	.6	1068.8	124.4	944.4	63.6	18.	3.	29.1	13.6	15.5	.56	1.44	.336	1.104	2.784	.656	2.128	.014	1.226
9078	Apr. 21	Apr. 23	d	c	.2	187.6	124.4	63.2	24.8	28.	1.8	11.7	9.5	2.2	.92	.304	.176	.128	.736	.336	.4	.005	.475
9116	May 20	May 21	d	c	...	217.6	137.2	80.4	36.4	29.2	1.9	13.4	10.8	2.6	.064	.288	.16	.128	.752	.352	.4	none	.12
9148	June 25	June 26	d	1	.3	213.2	141.6	71.6	32.4	18.8	2.6	11.7	8.4	3.3	.044	.32	.176	.144	.72	.368	.352	"	.12
9178	July 15	July 16	d	c	.3	251.6	164.	87.6	38.4	37.2	2.2	13.5	12.3	1.2	.06	.32	.192	.128	.912	.384	.528	"	.2
9196	" 22	" 23	d	c	.4	228.4	138.	90.4	33.2	27.2	2.1	15.2	11.1	4.1	.118	.32	.192	.128	.784	.448	.336	"	.16
9231	" 29	" 30	d	c	.7	210.4	140.4	70.	33.	29.6	1.	15.4	14.3	1.1	.118	.352	.272	.08	.736	.624	.112	"	.12
9276	Aug. 5	Aug. 6	d	c	.5	208.4	139.2	69.2	36.	23.8	2.2	16.4	15.	1.4	.096	.416	.304	.112	.752	.528	.224	"	.08
9298	" 14	" 15	d	c	.5	202.4	150.8	51.6	38.	40.	2.2	14.4	14.1	.3	.08	.336	.24	.096	.688	.352	.336	"	.12
9313	" 19	" 20	d	c	.4	195.6	124.8	70.8	36.4	24.	2.2	14.2	12.6	1.6	.108	.304	.16	.144	.624	.368	.256	"	.08
9320	" 26	" 27	d	c	...	187.2	144.	43.2	22.4	21.2	2.2	15.2	14.3	.9	.096	.336	.192	.144	.752	.368	.384	"	.22
9350	Sept. 2	Sept. 4	d	c	.4	184.8	141.6	43.2	35.2	30.8	2.	15.2	15.2	....	.072	.304	.192	.112	.656	.352	.304	"	.16
9362	" 9	" 10	d	c	.05	186.8	139.6	47.2	32.8	31.6	2.	14.5	12.7	1.8	.15	.336	.24	.096	.656	.352	.304	"	.32
9383	" 16	" 17	d	c	.3	201.6	155.6	46.	32.8	31.6	2.9	13.9	12.	1.9	.06	.304	.16	.144	.....	....	.....	"	.08
9402	" 23	" 24	d	c	.2	190.	149.6	40.4	38.	36.4	3.5	13.3	11.5	1.8	.136	.336	.16	.176	.....	....	.....	0.001	.2

CHEMICAL EXAMINATION OF WATER FROM THE MISSISSIPPI RIVER AT GRAFTON.—CONTINUED.
(Parts per 1,000,000.)

Serial Number.	1901. Date of		Appearance.			Residue on Evaporation.					Chlorine.	Oxygen Consumed.			Nitrogen as Ammonia				Organic Nitrogen.			Nitrogen as	
	Collection.	Examination.	Turbidity.	Sediment.	Color.	Total.	Dissolved.	Suspended.	Loss on Ignition. Total.	Loss on Ignition. Dissolved.		Total.	By Dissolved.	By Suspended Matt'r.	Free Ammonia.	Albuminoid Ammonia. Total.	Albuminoid Ammonia. Dissolved.	Albuminoid Ammonia. Suspended	Total.	Dissolved.	Suspended	Nitrites.	Nitrates.
9417	Sept. 30	Oct. 1	d	c	.2	204.8	135.2	69.6	28.4	28.4	3.6	9.1	7.2	1.9	.152	.288	.128	.16	....	....	....	none	.16
9447	Oct. 7	" 8	d	c	...	201.2	166.4	34.8	24.8	18.8	3.6	12.6	10.9	1.7	.052	.304	.192	.112	....	....	....	.001	.16
9491	" 14	" 15	d	c	.13	183.2	148.4	34.8	27.2	13.6	3.4	11.6	9.1	2.5	.0?2	.272	.16	.112	....	....	....	none	.04
9546	" 21	" 22	d	c	.4	186.4	123.2	63.2	23.6	30.8	2.9	12.1	8.6	3.5	.08	.32	.176	.144	....	....	....	.002	.038
9608	" 28	" 29	d	c	.6	167.6	120.8	46.8	26.	20.	2.8	14.1	9.8	4.3	.088	.368	.224	.144	....	....	....	.001	.12
9674	Nov. 6	Nov. 7	d	c	.7	166.4	121.1	45.2	27.6	28.4	2.3	14.1	11.7	2.4	.048	.288	.192	.196	....	....	....	none	none
9753	" 13	" 14	d	c	.3	170.	126.4	43.6	27.6	28.8	3.6	11.7	9.1	2.6	.064	.224	.16	.064	....	....	....	"	.12
9797	" 18	" 19	d	1	.3	147.6	131.6	16.	24.4	21.6	3.5	9.1	8.3	.8	.048	.224	.16	.064	....	....	....	"	.16
9864	" 25	" 26	d	1	.2	150.	138.	12.	32.4	32.4	3.2	11.4	8.6	2.8	.04	.208	.16	.048	....	....	....	"	.12
9938	Dec. 2	Dec. 3	d	1	.2	166.	144.	22.	32.	32.	3.5	11.8	8.9	2.9	.052	.256	.192	.064	....	....	....	"	.08
10021	" 9	" 10	d	1	.3	162.8	157.6	5.2	21.2	18.4	3.1	12.6	8.5	4.1	.06	.288	.16	.128	....	....	....	"	.16
10095	" 16	" 17	d	1	.05	162.8	143.2	19.6	27.6	26.4	3.8	11.8	8.5	3.3	.028	.256	.16	.096	....	....	....	"	.18
10139	" 23	" 25	d	1	.05	182.4	170.	12.4	37.6	26.4	5.4	11.1	10.1	1.	.032	.288	.176	.112	....	....	....	"	.32
Average Feb. 21—June 25						391.8	142.1	249.7	35.3	21.6	2.8	15.1	10.2	4.9	.517	.524	.211	.313	1.116	.441	.675	.01	.53
Average July 15—Dec. 23						188.	143.2	44.8	30.7	27.4	2.8	13.1	11.	2.1	.081	.302	.191	.111	.723	.413	.31	.001	.133
Average Feb. 21—Dec. 23						280.6	142.7	137.9	32.8	64.8	2.8	14.1	10.6	3.5	.279	.403	.202	.201	.969	.431	.538	.006	.314

* The water of the Mississippi is at all times so turbid or muddy that it has been necessary, invariably, to filter before attempting to determine the color.
Odor none. Color upon ignition brown.

CHEMICAL EXAMINATION OF WATER FROM THE MISSISSIPPI RIVER AT QUINCY.
(Parts Per 1,000,000.)

Serial Number.	1897 Date of Collection.	1897 Date of Examination.	Appearance. Turbidity.	Appearance. Sediment.	Appearance. Color.	Residue on Evaporation. Total.	Residue on Evaporation. Dissolved.	Residue on Evaporation. Suspended.	Residue on Evaporation. Loss on Ignition. Total.	Residue on Evaporation. Loss on Ignition. Dissolved.	Chlorine.	Oxygen Consumed. Total.	Oxygen Consumed. By Dissolved.	Oxygen Consumed. By Suspended Matt'r	Nitrogen as Ammonia. Free Ammonia.	Nitrogen as Ammonia. Albuminoid Ammonia. Total.	Nitrogen as Ammonia. Albuminoid Ammonia. Dissolved.	Nitrogen as Ammonia. Albuminoid Ammonia. Suspended	Organic Nitrogen. Total.	Organic Nitrogen. Dissolved.	Organic Nitrogen. Suspended	Nitrogen as Nitrites.	Nitrogen as Nitrates.
1917	Feb. 15	Feb. 16	d	1	.3*.4	218.	190.8	27.2	12.8	10.4	3.4	9.1	8.1	1.	.128	.32	.24	.08	.64	.56	.08	.005	1.4
1942	" 24	" 25	d	c	.5	415.2	184.4	230.8	43.6	29.2	3.	15.2	7.3	7.9	.2	.72	.216	.504	1.44	.8	.64	.17	1.
1976	Mar. 8	Mar. 9	d	c	.2	289.6	169.6	120.	30.	30.	3.	12.6	7.5	5.1	.204	.64	.24	.4	1.39	.51	.88	.05	.3
2006	" 15	" 16	d	c	.3	516.8	180.8	336.	42.8	31.2	2.	18.3	7.4	10.9	.252	.8	.24	.56	1.71	.67	1.04	.04	1.1
2034	" 22	" 23	d	m	.5	534.	162.	372.	57.2	30.4	3.	25.3	8.9	16.4	.144	1.28	.32	.96	2.2	.68	1.52	.04	1.
2054	" 29	" 30	v d	m	.4	451.2	163.2	288.	48.	38.2	1.6	26.7	8.	18.7	.204	.96	.4	.56	2.04	.76	1.28	.025	.9
2091	April 5	Apr. 6	v d	m	1.	340.4	146.	194.4	29.2	16.4	1.6	19.8	8.2	11.6	.176	.56	.192	.368	1.4	.67	.73	.04	1.
2110	" 12	" 13	d	c	.3	207.2	144.8	62.4	22.	21.4	2.	11.4	7.5	3.9	.104	.4	.32	.08	1.05	.6	.45	.026	1.1
2129	" 19	" 20	d	1	.5	167.2	116.4	60.8	20.4	17.2	1.4	13.	8.4	4.6	.032	.4	.208	.192	.83	.6	.23	.03	.6
2156	" 26	" 27	d	c	.3	287.2	126.	161.2	32.	26.	1.6	16.	9.2	6.8	.005	.48	.256	.224	1.19	.55	.64	.025	.6
2178	May 3	May 4	d	c	.4	181.6	138.8	42.8	22.	14.	1.	12.5	9.3	3.2	.016	.56	.272	.288	1.11	.53	.58	.003	.25
2201	" 10	" 11	d	c	......	186.8	141.6	45.2	22.8	20.4	1.6	15.2	12.3	2.9	.076	.48	.308	.112	.95	.71	.24	.006	.2
2218	" 17	" 18	d	c	.2	202.	148.4	53.6	24.	17.6	1.4	15.8	12.7	3.1	.04	.32	.224	.096	.91	.67	.24	.005	.2
2251	" 24	" 25	d	c	.3	211.6	161.2	50.4	25.6	16.8	1.2	13.	12.1	.9	.036	.56	.288	.272	1.07	.6	.47	.002	.2
2280	" 31	June 1	d	c	.2	226.4	165.2	61.2	19.2	16.	1.6	15.8	12.1	3.7	.02	.56	.4	.16	.91	.57	.34	.007	.2
2303	June 7	" 8	d	c	.3	188.4	147.6	50.8	26.	22.8	2.	17.2	14.6	2.6	.036	.72	.48	.24	1.37	1.05	.32	.007	.15
2320	" 14	" 15	d	c	.3	208.	150.	58.	26.8	16.8	1.6	16.5	13.2	3.3	.084	.4	.272	.128	1.05	.73	.32	.005	.05
2356	" 21	" 22	d	c	.2	232.	142.	90.	24.4	19.2	1.6	16.6	14.4	2.2	.044	.56	.4	.16	.89	.57	.32	.005	.2
2382	" 28	" 29	d	c	.2	311.2	174.	137.2	24.	22.	1.	17.5	11.8	5.7	.012	.72	.288	.272	.9	.41	.49	.03	.4
2418	July 6	July 7	v d	m	.15	574.8	183.2	391.6	33.2	22.	1.4	20.6	15.	5.6	.016	.4	.288	.432	1.8	1.	.8	.055	.8
2438	" 12	" 13	d	c	.1	248.8	158.	90.8	16.	14.8	3.2	16.	12.3	3.7	.012	.72	.32	.08	1.08	.84	.24	.008	.3
2465	" 19	" 20	d	c	.5	380.	164.4	215.6	28.	25.2	1.4	21.4	14.2	7.2	.016	.48	.4	.32	1.32	.52	.8	.005	.45
2486	" 26	" 27	d	c	.1	338.	175.2	162.8	26.	18.	.8	18.4	14.	4.4	.018	.288	.416	.064	1.24	.68	.56	.01	.4
2521	Aug. 2	Aug. 3	d	c	.6	237.2	282.	55.2	28.	22.	1.	18.3	16.	2.3	.02	.72	.416	.304	1.08	.88	.2	.008	.22

*Not filtered.

CHEMICAL EXAMINATION OF WATER FROM THE MISSISSIPPI RIVER AT QUINCY.—CONTINUED.
(Parts Per 1,000,000.)

Serial Number.	1897 Date of		Appearance.			Residue on Evaporation.					Chlorine.	Oxygen Consumed.			Nitrogen as Ammonia				Organic Nitrogen.			Nitrogen as	
	Collection.	Examination.	Turbidity.	Sediment.	Color.	Total.	Dissolved.	Suspended.	Loss on Ignition. Total.	Loss on Ignition. Dissolved.		Total.	By Dissolved.	By Suspended Matt'r	Free Ammonia.	Albuminoid Ammonia. Total.	Albuminoid Ammonia. Dissolved.	Albuminoid Ammonia. Suspended	Total.	Dissolved.	Suspended	Nitrites.	Nitrates.
2540	Aug. 9	Aug. 10	d	c	.5	241.2	165.2	76.	19.2	17.2	1.4	18.	16.	2.	.014	.64	.384	.256	1.24	1.	.24	.006	.4
2567	" 16	" 17	d	c	.8	204.	143.2	60.8	20.8	20.	1.2	19.2	18.	1.2	.012	.96	.448	.512	1.	.68	.32	.005	.3
2588	" 23	" 24	d	c	.4	248.	161.2	86.8	20.	18.4	2.	18.3	17.4	.9	.028	.56	.512	.048	1.06	.66	.4	.003	.3
2614	" 30	" 31	d	c	.4	220.	168.8	51.2	23.2	18.8	2.3	17.9	15.3	2.6	.026	.52	.32	.2	.98	.58	.4	.002	.15
2633	Sept. 6	Sept. 7	d	c	.3*.5	212.4	168.4	44.	14.4	12.	2.5	15.2	14.5	.7	.018	.52	.32	.2	.82	.46	.36	.002	.2
2664	" 13	" 14	d	c	.6	233.2	171.6	61.6	13.2	12.8	2.5	14.8	12.3	2.5	.044	.52	.32	.2	.98	.54	.44	.014	.5
2688	" 20	" 21	d	c	.2	223.2	181.6	41.6	13.2	12.	2.5	13.7	11.2	2.5	.008	.4	.28	.12	....	.54	...	.004	.1
2724	" 28	" 29	d	c	.1	244.	178.8	65.2	17.2	14.	2.6	12.4	9.9	2.5	.012	.44	.3	.14	.7	.54	.16	.012	.55
2758	Oct. 5	Oct. 6	d	c	.2	216.4	170.	46.4	21.2	16.8	2.6	13.7	11.4	2.3	.018	.44	.28	.16	.78	.5	.28	.008	.1
2784	" 12	" 13	d	c	.07	247.2	176.8	70.4	21.2	16.	2.4	14.4	8.8	5.6	.006	.4	.22	.18	.86	.5	.36	.02	.12
2815	" 18	" 19	d	c	.1	233.6	180.4	53.2	19.2	16.	2.6	13.	8.5	4.5	.004	.44	.24	.2	.94	.5	.44	.014	.1
2842	" 25	" 26	d	c	.1	234.	178.8	55.2	17.2	13.2	2.5	12.8	10.4	2.4	.003	.44	.2	.24	.7	.5	.2	none	.05
2916	Nov. 7	Nov. 9	d	1	.2*.25	182.8	156.8	26.	28.	19.3	2.3	12.5	10.5	2.	.008	.36	.2	.16	.58	.42	.16	.001	.05
2950	" 15	" 16	d	c	.09	184.8	161.6	23.2	22.8	17.2	2.4	12.6	9.3	3.3	.003	.28	.2	.08	.54	.42	.12	.001	.12
2984	" 22	" 25	d	c	.07*.1	186.8	175.2	11.6	18.	12.8	2.5	9.6	7.9	1.7	.001	.24	.2	.04	.5	.42	.08	none	.45
3005	" 29	Dec. 1	d	c	.1*.2	181.2	179.6	1.6	22.	20.8	2.7	10.2	9.2	1.	.004	.32	.24	.08	.53	.33	.2	.002	.55
3025	Dec. 6	" 7	d	1	.08*.1	238.	224.8	3.2	22.	20.4	3.9	9.2	8.	1.2	.118	.32	.176	.144	....	.41	...	none	.17
3058	" 13	" 14	d	1	.1*.15	200.	194.4	5.6	20.	16.	3.7	8.5	7.	1.5	.05	.28	.22	.06	.69	.37	.32	.004	.4
3078	" 20	" 21	d	1	.1*.2	216.	208.	8.	24.8	21.2	3.2	8.5	7.5	1.	.002	.32	.22	.1	.61	.33	.28	none	.1
3096	" 27	" 28	d	1	.1*.2	219.2	208.	11.2	18.8	17.2	2.8	8.8	7.1	1.7	.002	.28	.144	.136	.61	.37	.24	.003	.24
Average Feb. 15—June 28						283.1	155.4	127.6	29.1	21.	1.8	15.1	10.1	4.9	.098	.59	.311	.279	1.21	.64	.56	.027	.91
Average July 6—Dec. 27						245.7	177.	65.1	20.3	17.1	2.2	14.3	10.9	3.4	.014	.46	.214	.254	.82	.69	.13	.007	.28
Average Feb. 15—Dec. 27						262.	167.7	94.3	24.1	19.2	1.9	14.6	10.5	4.1	.05	.52	.293	.227	.99	.67	.32	.016	.55

The water in all cases was odorless. The Color upon ignition was brown.
*Not filtered.

Chemical Examination of Water from the Mississippi River at Quincy.

(Parts per 1,000,000.)

Serial Number.	1898 Date of		Appearance.			Residue on Evaporation.					Chlorine.	Oxygen Consumed.			Nitrogen as Ammonia				Organic Nitrogen.			Nitrogen as	
	Collection.	Examination	Turbidity.	Sediment.	Color.	Total.	Dissolved.	Suspended.	Loss on Ignition. Total.	Loss on Ignition. Dissolved.		Total.	By Dissolved.	By Suspended Matt'r.	Free Ammonia.	Albuminoid Ammonia. Total.	Albuminoid Ammonia. Dissolved.	Albuminoid Ammonia. Suspended	Total.	Dissolved.	Suspended	Nitrites.	Nitrates.
3121	Jan. 3	Jan. 4	d	l	.06*.1	207.2	193.2	14.	19.2	15.2	2.6	7.1	6.	1.1	.003	.352	.176	.176	.65	.33	.32	.001	.11
3149	" 10	" 11	d	l	.06*.1	208.	197.2	10.8	19.2	18.4	2.6	7.7	6.	1.7	.006	.32	.192	.128	.68	.28	.4	.001	.18
3170	" 17	" 18	v d	v m	.15	374.8	179.2	195.6	40.8	18.	3.4	18.5	7.8	10.7	.078	.64	.224	.416	1.48	.4	1.08	.03	.36
3207	" 24	" 25	d	c	.4	263.6	204.	59.6	27.6	24.	4.5	13.5	8.9	4.6	.202	.44	.32	.12	1.	.56	.44	.06	.45
3218	" 31	Feb. 1	d	c	…….	226.8	198.8	28.	30.	28.	3.1	9.3	8.4	.9	.092	.44	.272	.168	.8	.48	.32	.12	.7
3245	Feb. 7	" 8	d	c	.3	218.8	202.8	16.	27.2	25.6	3.4	8.	6.6	1.4	.04	.4	.22	.18	.76	.48	.28	.004	.24
3270	" 14	" 16	d	c	.2	300.8	188.4	112.4	23.6	20.	2.8	13.5	7.1	6.4	.158	.48	.2	.28	1.08	.56	.52	.04	.6
3290	" 21	" 22	d	c	.2	204.8	145.2	59.6	24.	20.4	2.5	12.	8.2	3.8	.25	.48	.32	.16	.92	.52	.4	.006	.4
3310	" 28	Mar. 1	d	c	.3	180.8	149.2	31.6	22.8	18.4	2.8	9.	7.4	1.6	.238	.32	.24	.08	.84	.6	.24	.003	.55
3326	Mar. 6	" 8	d	c	.2	246.8	185.2	61.6	17.2	15.2	2.7	11.5	6.7	4.8	.134	.48	.28	.2	1.	.52	.48	.008	.55
3358	" 14	" 15	d	m	.2	544.	167.6	376.4	34.	21.2	2.6	17.3	7.	10.3	.172	.8	.32	.48	1.72	.52	1.2	.016	.55
3381	" 21	" 22	v d	v m	.4	612.8	167.6	445.2	38.	18.	2.6	24.5	8.1	16.4	.182	.92	.36	.56	2.04	.76	1.28	.035	.6
3424	April 4	April 5	d	c	.1	384.	183.6	200.4	37.2	19.2	2.6	16.	8.5	7.5	.01	.68	.32	.36	1.65	.65	1.	.02	.55
3444	" 11	" 12	d	c	.1	290.4	168.	122.4	32.4	28.8	2.8	15.6	8.	7.6	.024	.72	.24	.48	1.65	.81	.84	.008	.55
3469	" 18	" 19	d	c	.1	257.6	168.8	88.8	29.6	22.	4.8	13.3	8.	5.3	.03	.56	.272	.288	1.25	.65	.6	.005	.5
3497	" 25	" 26	d	c	.06	292.	146.	146.	27.6	16.	2.6	14.7	7.7	7.	.02	.6	.24	.36	1.05	.65	.4	.008	.5
3527	May 1	May 3	d	c	.2	428.	174.4	253.6	35.2	16.	2.8	18.2	10.8	7.4	.044	.72	.4	.32	1.34	.82	.52	.014	.2
3549	" 9	" 10	d	c	.2	219.2	164.	55.2	30.4	24.	2.5	13.2	9.4	3.8	.038	.44	.32	.12	.98	.54	.44	.002	.2
3582	" 16	" 17	d	m	.5	478.8	151.2	327.6	44.	31.2	2.4	18.3	9.1	9.2	.054	.88	.44	.44	1.94	.66	1.28	.02	.4
3609	" 23	" 24	d	c	.2	442.	141.6	300.4	34.	19.2	2.5	17.6	8.5	9.1	.054	.8	.48	.32	1.86	.86	1.	.04	.3
3635	" 30	June 1	d	c	.06	313.6	174.4	139.2	19.6	16.	3.	12.8	7.3	5.5	.054	.4	.24	.16	1.14	.58	.56	.023	.35
3656	June 6	" 7	d	c	.05	337.6	168.	169.6	30.	29.2	2.6	15.2	7.6	7.6	.014	.52	.28	.24	1.16	.72	.44	.065	.25
3684	" 13	" 14	d	c	…..	456.4	166.	290.4	28.4	22.8	2.3	16.7	7.6	8.1	.018	.56	.24	.32	1.36	.52	.84	.06	.4
3705	" 20	" 21	d	m	…..	341.2	184.8	156.4	22.8	21.6	3.	13.	8.5	5.	.02	.4	.28	.12	1.04	.64	.4	.024	.45
3753	" 28	" 29	d	c	.2	345.2	…..	…..	28.	…..	3.	18.3	9.5	8.8	.006	.56	.28	.28	1.	.52	.48	.036	.3
3784	July 5	July 6	d	c	.2	294.8	171.6	123.2	26.	24.	4.4	16.2	13.	3.2	.034	.48	.28	.2	1.28	.6	.68	.03	.2
3809	" 11	" 12	d	c	.1	328.2	166.4	56.8	26.	16.	2.5	15.4	12.3	3.1	.014	.52	.4	.12	.92	.72	.2	.002	.2

*Not filtered.

CHEMICAL EXAMINATION OF WATER FROM THE MISSISSIPPI RIVER AT QUINCY.—CONTINUED.
(Parts Per 1,000,000.)

Serial Number.	1898 Date of Collection.	Examination.	Appearance. Turbidity.	Sediment.	Color.	Residue on Evaporation. Total.	Dissolved.	Suspended.	Loss on Ignition. Total.	Dissolved.	Chlorine.	Oxygen Consumed. Total.	By Dissolved.	By Suspended Matt'r	Nitrogen as Ammonia. Free Ammonia.	Albuminoid Ammonia. Total.	Dissolved.	Suspended	Organic Nitrogen. Total.	Dissolved.	Suspended	Nitrogen as Nitrites.	Nitrates.
3834	July 18	July 19	d	l	.1*.2	228.4	153.6	74.8	20.8	18.	1.6	14.5	12.2	2.3	.01	.48	.28	.2	.68	.4	.28	.001	.1
3873	“ 25	“ 26	d	c	.05*.4	201.6	154.8	46.8	16.	14.	2.2	14.2	13.	1.2	.036	.44	.28	.16	.88	.48	.4	none	.15
3899	Aug. 1	Aug. 2	d	c	.04*.2	195.2	158.	37.2	20.8	16.	2.	13.3	12.3	1.	.002	.36	.28	.08	.72	.44	.28	“	.35
3932	“ 8	“ 9	d	c	.04	228.	160.	68.	20.8	20.	2.5	13.2	8.8	4.4	.004	.52	.36	.16	.88	.48	.4	.001	.075
3953	“ 15	“ 16	d	m	.04	412.	146.	266.	34.	21.2	2.2	16.	11.5	4.5	.02	.64	.4	.24	1.2	.72	.48	.03	.15
3988	“ 23	“ 24	d	c	.05	306.8	155.2	151.6	25.2	22.	2.2	11.3	6.1	5.2	. 018	.44	.24	.2	.88	.4	.48	.08	.35
4021	“ 30	Sept. 2	d	c	.04	245.2	171.2	74.	22.	20.	2.7	10.7	7.5	3.2	. 046	.36	.28	.08	.84	....	....	.01	.2
4048	Sept. 6	“ 7	d	m	.04	603.6	153.2	450.4	29.2	20.	2.6	16.5	7.3	9.2	.028	.64	.28	.36	1.36	.32	1.04	.006	.1
4067	“ 12	“ 13	d	c	.04	229.2	169.2	60.	22.	18.	2.8	9.9	6.7	3.2	.014	.36	.24	.12	.72	.36	.36	.002	.15
4090	“ 19	“ 20	d	c	.04	235.2	171.2	64.	28.	20.	2.6	11.	6.8	4.2	.01	.4	.18	.22	.72	.28	.44	.002	.2
4120	“ 26	“ 27	d	c	.6	392.8	231.2	161.6	26.	18.	2.8	13.4	7.	6.4	.074	.56	.24	.32	1.2	.464	.736	.012	.25
4168	Oct. 4	Oct. 5	d	c	.04	235.6	179.6	56.	26.	22.	3.1	8.6	5.7	2.9	.016	.36	.24	.12	.72	.36	.36	.02	.3
4193	“ 11	“ 12	d	c	.05	236.	176.	60.	26.	22.	2.7	11.2	6.1	5.1	.016	.4	.2	.2	.73	.33	.4	.013	.25
4247	“ 23	“ 25	d	l	.08	198.	172.	26.	20.	16.	2.5	7.2	5.3	1.9	.012	.28	.16	.12	.53	.29	.24	.002	.123
4294	“ 31	Nov. 1	d	c	.04	198.	168.	30.	22.	18.	3.	6.8	5.	1.8	.012	.304	.144	.16	.57	.258	.312	.004	.25
4337	Nov. 8	“ 9	d	c	.06	196.8	172.	24.8	34.	26.	2.6	8.1	6.4	1.7	.022	.32	.192	.128	.55	.35	.2	.003	.4
4369	“ 15	“ 16	d	l	.03*.07	182.8	174.	8.8	24.	22.	3.	7.3	6.2	1.1	.004	.28	.144	.136	.51	.35	.2	.003	.15
4395	“ 21	“ 22	d	c	.03	188.	172.8	15.2	20.	16.	3.4	8.6	6.8	1.8	.028	.32	.208	.112	.63	.27	.36	.002	.3
4426	“ 28	“ 29	s	l	.07*.2	198.8	189.2	9.6	34.	23.2	4.	8.6	7.1	1.5	.014	.32	.176	.144	.59	.35	.24	none	.4
4453	Dec. 5	Dec. 6	d	l	.03	232.	194.	38.	35.2	26.	4.8	8.6	6.7	1.9	.086	.288	.144	.144	.65	.37	.28	.004	.15
4481	“ 13	“ 14	d	l	.03	228.8	218.	10.8	38.8	32.	3.4	8.7	7.	1.7	.004	.368	.16	.208	.65	.29	.36	none	.1
4505	“ 20	“ 21	d	l	.03*.06	222.8	212.8	10.	36.	34.8	4.	8.3	6.8	1.5	.016	.352	.144	.208	.61	.37	.24	.001	.1
Average Jan. 3—June 28						327.	166.7	160.3	33.2	20.3	2.9	14.1	7.9	7.7	.077	.556	.286	.27	1.215	.585	.63	.025	.405
Average July 5—Dec. 20						258.9	174.5	84.3	28.	21.4	2.7	11.1	8.2	2.8	.024	.408	.235	.173	.792	.346	.446	.009	.208
Average Jan. 3—Dec 20						293.6	170.5	123.1	30.6	20.8	2.9	12.6	8.1	4.5	.052	.483	.261	.222	1.008	.488	.519	.017	.31

The water in all cases was odorless The Color upon ignition was brown.
*Not filtered.

CHEMICAL EXAMINATION OF WATER FROM THE MISSISSIPPI RIVER AT QUINCY.
(Parts Per 1,000,000.)

Serial Number.	1899 Date of		Appearance.			Residue on Evaporation.					Chlorine.	Oxygen Consumed.			Nitrogen as Ammonia				Organic Nitrogen.			Nitrogen as	
									Loss on Ignition.						Free Ammonia.	Albuminoid Ammonia.							
	Collec-tion.	Exami-nation.	Turbidity.	Sediment.	Color.	Total.	Dissolved.	Suspended.	Total.	Dis-solved.		Total.	By Dis-solved.	By Suspended Matt'r		Total.	Dis-solved.	Sus-pended	Total.	Dissolved.	Suspended	Nitrites.	Nitrates.
4565	Jan. 3	Jan. 4	d	l	.04	225.2	205.2	20.	32.4	30.	3.4	11.5	7.3	4.2	.024	.4	.176	.224	.73	.37	.36	.001	.1
4592	" 9	" 10	d	c	.04	226.8	198.4	28.4	30.	26.4	3.5	8.3	7.6	.7	.02	.336	.176	.16	.69	.41	.28	.008	.15
4699	" 13	" 14	d	l	.05*.3	248.	238.	10.	38.	28.	4.9	8.9	6.5	2.4	.022	.368	.176	.192	.74	.3	.44	.004	.3
4769	Mar. 2	Mar. 3	d	c	....	298.8	160.8	138.	30.	24.	3.4	15.2	8.6	6.6	.154	.44	.24	.2	1.1	.46	.64	.03	.4
4952	Apr. 18	Apr. 19	d	c	.3	238.	141.2	96.8	30.	25.2	3.	12.9	8.2	4.7	.294	.44	.24	.2	.83	.47	.36	.02	.5
5088	May 24	May 25	v d	m	.4	354.2	149.2	205.	30.8	13.2	2.3	21.1	14.4	6.7	.18	.72	.352	.368	1.21	.7	.51	.007	1.04
5196	June 12	June 13	d	c	.5	486.4	166.2	319.2	41.2	18.4	1.8	21.7	11.6	9.5	.018	.64	.32	.32	1.48	.664	.816	.007	.52
5680	Aug.22	Aug. 23	d	c	.15	248.8	166.8	82.	46.4	39.2	2.7	12.5	10.	2.5	.024	.432	.192	.24	1.	.408	.592	.007	.08
5909	Sept.20	Sept. 21	d	c	.07	315.6	231.2	84.4	38.	29.2	1.7	13.8	8.2	5.6	.016	.352	.192	.16	1.	.344	.656	.006	.12
6085	Oct. 17	Oct. 18	d	c	.04	204.	154.	50.	20.4	19.2	3.	11.4	10.3	1.1	.124	.304	.24	.064	.872	.392	.48	.005	.16
6518	Dec. 13	Dec. 14	d	c	.3	164.	137.2	26.8	20.	18.8	3.	11.9	10.9	1.	.036	.384	.24	.144	.904	.584	.32	.008	.24
Average Jan. 3—June 12................................						296.7	179.8	116.9	33.2	23.6	3.1	14.2	9.1	5.	.101	.477	.24	.237	.968	.482	.446	.011	.43
Average Aug. 22—Dec. 13............................						233.1	172.3	60.8	31.2	26.6	2.6	12.4	9.8	2.5	.075	.443	.216	.227	.944	.432	.512	.006	.15
Average Jan. 3—Dec.13..................................						273.6	177.1	96.5	31.7	24.6	2.9	13.5	9.4	4.1	.092	.465	.231	.233	.959	.463	.495	.009	.32

Not filtered.

CHEMICAL EXAMINATION OF WATER FROM THE MISSISSIPPI RIVER AT QUINCY.
(Parts per 1,000,000.)

Serial Number.	1900. Date of Collection.	1900. Date of Examination.	Appearance. Turbidity.	Appearance. Sediment.	Appearance. Color.	Residue on Evaporation. Total.	Residue on Evaporation. Dissolved.	Residue on Evaporation. Suspended.	Residue on Evaporation. Loss on Ignition. Total.	Residue on Evaporation. Loss on Ignition. Dissolved.	Chlorine.	Oxygen Consumed. Total.	Oxygen Consumed. By Dissolved.	Oxygen Consumed. By Suspended Matt'r	Nitrogen as Ammonia. Free Ammonia.	Nitrogen as Ammonia. Albuminoid Ammonia. Total.	Nitrogen as Ammonia. Albuminoid Ammonia. Dissolved.	Nitrogen as Ammonia. Albuminoid Ammonia. Suspended	Organic Nitrogen. Total.	Organic Nitrogen. Dissolved.	Organic Nitrogen. Suspended	Nitrogen as Nitrites.	Nitrogen as Nitrates.
6729	Jan. 22	Jan. 23	d	m	.05	254.4	170.8	83.6	30.8	14.	2.4	14.3	9.4	4.9	.072	.48	.192	.288	1.04	.48	.56	.006	.6
7067	Mar. 12	Mar. 13	vd	vm	.08	1248.4	93.2	1155.2	58.4	10.4	.8	24.	5.4	18.6	.24	1.088	.16	.928	2.64	.352	2.288	.007	.48
7325	Apr. 16	Apr. 17	d	c	.3	258.4	125.8	112.8	24.	20.8	.8	12.2	7.6	4.6	.128	.368	.208	.16	1.	.504	.496	.016	.56
7538	May 15	May 16	d	c	.2	266.8	148.	118.8	27.6	26.8	2.6	15.1	10.6	4.5	.062	.448	.16	.288	1.156	.292	.864	.005	.16
8016	July 24	July 25	d	vm	.03	468.4	136.4	332.	56.	26.4	2.2	17.7	9.2	8.5	.102	.56	.16	.4	.98	.292	.678	.001	.6
8248	Aug. 20	Aug. 22	d	c	.2	576.4	144.	432.4	62.4	19.2	3.1	17.6	7.4	10.2	.126	.704	.224	.48	1.34	.332	1.008	.012	1.24
8602	Oct. 2	Oct. 3	d	c	1.3	246.	148.	98.	51.2	32.8	1.	27.2	17.9	9.3	.138	.416	.384	.032	1.216	.576	.64	.001	.24
8679	" 19	" 20	d	c	1.	250.	126.8	23.2	46.8	39.6	1.6	24.7	22.	2.7	.158	.464	.272	.194	.992	.608	.384	.004	.276
8826	Nov. 26	Nov. 27	d	c	.8	161.2	138.4	22.8	27.6	26.4	1.4	17.5	16.5	1.	.076	.288	.208	.08	.592	.48	.112	.007	.353
Average Jan. 22—May 15						502.	109.4	392.6	35.2	18.	1.4	16.4	8.2	8.2	.125	.596	.18	.416	1.459	.409	1.05	.008	.45
Average July 21—Nov. 26						340.4	138.7	101.7	48.8	28.	1.8	20.9	14.6	6.3	.124	.486	.249	.237	1.024	.457	.567	.005	.541
Average Jan. 22—Nov. 26..........						412.4	125.5	285.6	42.7	24.	1.7	18.9	11.7	7.2	.122	.535	.218	.317	1.106	.436	.67	.006	.501

The water in all cases was odorless. The Color upon ignition was brown.

CHEMICAL EXAMINATION OF WATER FROM THE KANKAKEE RIVER AT WILMINGTON.
(Parts per 1,000,000.)

Serial Number.	1899 Date of		Appearance.			Residue on Evaporation.			Residue on Evaporation. Loss on Ignition.		Chlorine.	Oxygen Consumed.			Nitrogen as Ammonia	Nitrogen as Ammonia. Albuminoid Ammonia.			Organic Nitrogen.			Nitrogen as	
	Collection.	Examination.	Turbidity.	Sediment.	Color.	Total.	Dissolved.	Suspended.	Total.	Dissolved.		Total.	By Dissolved.	By Suspended Matt'r	Free Ammonia.	Total.	Dissolved.	Suspended	Total.	Dissolved.	Suspended	Nitrites.	Nitrates.
5156	June 5	June 6	d	c	.5	326.8	264.4	62.4	30.4	29.6	3.7	17.1	13.	4.1	.072	.56	.364	.196	1.29	.92	.39	.026	1.32
5200	" 12	" 13	d	c	.5	346.4	289.6	56.8	46.8	42.8	2.	19.5	17.5	2.	.128	.684	.608	.076	1.48	1.176	.304	.009	.76
5255	" 20	" 21	d	c	.4	317.2	299.6	17.6	24.8	22.8	2.	19.5	16.6	2.9	.06	.544	.448	.096	1.32	1.024	.296	.005	.48
5292	" 26	" 27	d	c	.3	350.8	298.4	52.4	24.8	12.8	2.	18.9	16.3	2.6	.042	.48	.368	.112	1.24	.952	.288	.001	.12
5382	July 10	July 11	d	c	.15	292.4	260.4	32.	42.4	32.4	3.9	10.2	7.5	2.7	.044	.384	.24	.144	.92	.6	.32	.01	.52
5424	" 17	" 18	d	c	.05	364.4	332.8	31.6	67.2	60.	3.2	11.8	10.2	1.6	.076	.352	.256	.096	1.016	.824	.192	.06	3.6
5479	" 24	" 25	d	l	.15	298.8	263.2	35.6	39.6	35.2	3.7	11.4	9.2	2.2	.016	.48	.256	.224	.84	....	....	.008	.32
5530	" 31	Aug. 1	d	c	.05	316.4	250.	66.4	51.6	50.8	3.4	14.2	11.	3.2	.068	.448	.228	.22	.84	.6	.24	.012	.24
5571	Aug. 7	" 8	d	c	.03	372.4	245.6	126.8	100.4	54.	3.2	15.	10.5	4.5	.048	.48	.24	.24	1.16	.504	.656	.004	.24
5626	" 14	" 15	d	c	.1	303.6	230.8	72.8	52.	46.4	4.1	14.	9.4	4.6	.052	.448	.208	.24	.984	.536	.448	.006	.16
5673	" 21	" 22	d	c	.15	297.6	237.2	60.4	30.8	....	3.9	11.8	9.	2.8	.044	.352	.272	.08	.984	.552	.432	.002	.08
5729	" 28	" 29	d	c	.06	312.8	239.2	73.6	23.6	17.2	3.9	11.5	9.2	2.3	.06	.48	.256	.224	1.	.536	.464	.007	.2
5788	Sept. 4	Sept. 5	d	c	.04	303.6	241.2	62.4	28.	22.8	4.6	11.1	9.1	2.	.092	.448	.256	.192	.888	.6	.288	.008	.2
5838	" 11	" 12	d	c	.15	278.	238.4	39.6	36.8	24.8	5.3	11.3	7.8	3.5	.08	.32	.224	.096	.92	.796	.124	.013	.2
5879	" 18	" 19	d	c	.08	286.4	226.4	60.	43.2	32.4	4.8	9.8	6.2	3.6	.044	.416	.272	.144	.84	.648	.192	.007	.2
5932	" 25	" 26	d	c	.04	263.2	234.	29.2	22.4	21.6	5.4	8.9	7.	1.9	.036	.272	.24	.032	.804	.548	.256	.004	.16

Chemical Examination of Water from the Kankakee River at Wilmington.—Continued.

(Parts per 1,000,000.)

Serial Number.	1899 Date of Collection.	1899 Date of Examination.	Appearance. Turbidity.	Appearance. Sediment.	Appearance. Color.	Residue on Evaporation. Total.	Residue on Evaporation. Dissolved.	Residue on Evaporation. Suspended.	Residue on Evaporation. Loss on Ignition. Total.	Residue on Evaporation. Loss on Ignition. Dissolved.	Chlorine.	Oxygen Consumed. Total.	Oxygen Consumed. By Dissolved.	Oxygen Consumed. By Suspended Matt'r	Nitrogen as Ammonia. Free Ammonia.	Nitrogen as Ammonia. Albuminoid Ammonia. Total.	Nitrogen as Ammonia. Albuminoid Ammonia. Dissolved.	Nitrogen as Ammonia. Albuminoid Ammonia. Suspended	Organic Nitrogen. Total.	Organic Nitrogen. Dissolved.	Organic Nitrogen. Suspended	Nitrogen as Nitrites.	Nitrogen as Nitrates.
5981	Oct. 2	Oct. 3	d	1	.07	240.8	232.8	8.	28.4	26.8	4.8	8.3	6.9	1.4	.012	.256	.208	.048	.58	.404	.176	.004	.16
6029	" 9	" 10	d	1	.03	265.6	253.3	12.	22.	....	4.9	7.	6.7	.3	.012	.256	.24	.016	.532	.392	.14	.005	.12
6077	" 16	" 17	d	1	.03	288.4	249.2	39.2	26.	23.2	4.9	7.3	6.8	.5	.028	.176	.096	.08	.68	.36	.32	.005	.24
6142	" 23	" 24	d	c	.04	....	241.2	....	....	14.4	4.7	5.8	4.9	.9	.016	.24	.16	.08	.456	.36	.096	.004	.08
6188	" 30	" 31	d	1	.04	255.2	229.2	26.	31.2	30.	4.7	5.3	4.7	.6	.02	.176	.128	.048	.312	.2	.112	.005	.16
6237	Nov. 6	Nov. 7	d	1	.04*.05	276.	273.6	2.4	16.	15.8	4.8	6.5	5.6	.9	.02	.24	.208	.032	.552	.424	.128	.002	.32
6269	" 13	" 14	d	1	.04*.1	....	....	....	....	....	4.	7.7	7.7	...	.012	.288	.256	.032	.76	.712	.048	.03	2.4
6332	" 20	" 21	d	c	.1	317.6	300.8	16.8	36.	33.6	3.6	8.4	8.	.4	.036	.288	.256	.032	.808	.616	.192	.02	3.6
6396	" 27	" 29	d	c	.2	310.4	297.6	12.8	25.2	21.2	3.6	9.5	9.2	.3	.054	.32	.288	.032	1.	.84	.16	.024	2.4
6443	Dec. 4	Dec. 5	d	1	.15*.2	296.4	289.2	7.2	39.2	38.4	3.6	8.8	8.8	...	.036	.336	.304	.032	.776	.68	.096	.007	1.68
6493	" 11	" 12	s	1	.07*.15	280.8	279.2	1.6	41.2	41.2	3.7	9.3	9.1	.2	.028	.432	.364	.068	.776	.68	.096	.005	1.48
6541	" 18	" 19	d	c	.2	313.2	280.	33.2	50.	45.2	3.1	11.6	9.7	1.9	.06	.352	.224	.128	1.	.84	.16	.018	6.
6580	" 26	" 27	d	c	.15	297.2	272.	25.2	41.6	36.8	3.5	10.7	9.7	1.	.068	.288	.24	.048	.936	.68	.256	.013	4.
Average Jan. 5—June 26............						335.3	288.	47.3	31.7	27.	2.4	18.7	15.8	2.9	.075	.567	.447	.12	1.333	1.018	.314	.01	.67
Average July 10—Dec. 26..........						273.2	247.9	25.3	38.9	28.9	4.1	9.8	8.1	1.7	.042	.34	.236	.103	.814	.557	.289	.011	1.15
Average June 5—Dec. 26...........						302.6	262.4	39.4	37.8	32.	3.8	11.1	9.2	1.9	.047	.371	.265	.106	.886	.594	.244	.011	1.08

The water in all cases was odorless. The color upon ignition was either dark gray or brown.

*Not filtered.

CHEMICAL EXAMINATION OF WATER FROM THE KANKAKEE RIVER AT WILMINGTON.
(Parts Per 1,000,000.)

Serial Number.	1900 Date of		Appearance.			Residue on Evaporation.					Chlorine.	Oxygen Consumed.			Nitrogen as Ammonia				Organic Nitrogen.			Nitrogen as	
	Collection.	Examination.	Turbidity.	Sediment.	Color.	Total.	Dissolved.	Suspended.	Loss on Ignition. Total.	Loss on Ignition. Dissolved.		Total.	By Dissolved.	By Suspended Matt'r	Free Ammonia.	Albuminoid Ammonia. Total.	Albuminoid Ammonia. Dissolved.	Albuminoid Ammonia. Suspended	Total.	Dissolved.	Suspended	Nitrites.	Nitrates.
6601	Jan. 1	Jan. 2	d	1	.08*.1	371.6	361.6	10.	39.6	36.4	4.	14.5	14.5	....	.06	.384	.368	.016	1.164	.936	.228	.015	4.8
6640	" 8	" 9	d	1	.1*.2	370.4	364.8	5.6	51.6	46.8	4.7	11.6	11.	.6	.048	.432	.4	.032	1.16	.936	.224	.017	4.4
6686	" 15	" 16	s	1	.02*.03	314.	313.2	.8	40.4	40.	3.9	8.1	7.9	.2	.04	.224	.208	.016	.704	.64	.064	.013	3.
6733	" 22	" 23	d	1	.15*.3	262.4	262.4	0.0	19.6	19.6	3.	7.6	7.6	0.0	.048	.24	.224	.016	.608	.544	.064	.01	2.4
6782	" 29	" 30	d	1	.06*.07	288.	282.4	5.6	39.6	37.2	3.2	8.4	8.4	0.0	.028	.352	.256	.096	.64	.48	.16	.005	2.6
6832	Feb. 5	Feb. 6	d	1	.1*.15	327.6	327.2	.4	40.8	20.4	3.7	12.3	10.8	1.5	.024	.32	.288	.032	.864	.768	.096	.005	2.2
6887	" 12	" 13	d	m	.15	877.6	173.2	704.4	64.8	22.4	2.6	23.9	8.3	15.6	.16	1.184	.352	.0832	2.56	.8	1.76	.02	4.
6928	" 19	" 20	d	1	.15	306.	290.	16.	40.	40.	3.6	9.	8.5	.5	.1	.416	.336	.08	.768	.608	.16	.017	4.2
7052	Mar. 9	Mar. 10	d	c	.04	246.4	167.2	79.2	22.8	22.	2.6	13.2	6.4	6.8	.16	.32	.192	.128	1.04	.544	.496	.017	1.76
7092	" 15	" 16	d	c	.4	612.4	112.	500.4	30.4	16.	1.4	21.2	8.3	12.9	.112	.96	.256	.704	2.4	.48	1.92	.01	1.08
7119	" 19	" 20	d	c	.2	243.2	161.2	82.	26.	13.6	2.8	12.3	8.6	3.7	.112	.384	.24	.144	.92	.568	.352	.009	1.8
7166	" 26	" 27	d	c	.25	199.6	165.8	32.8	22.8	16.	2.4	11.	8.8	2.2	.08	.64	.256	.384	1.08	.824	.256	.097	1.76
7210	April 2	Apr. 3	d	c	.2	369.6	150.4	219.2	31.6	16.	2.7	17.3	9.6	7.7	.072	.512	.24	.272	1.24	.632	.608	.011	2.88
7265	" 9	" 10	d	1	.03	848.8	304.2	47.6	28.8	28.8	1.1	6.1	5.1	1.	.02	.224	.144	.08	.536	.408	.128	.014	5.6
7322	" 16	" 17	d	1	.04	318.	304.8	13.2	42.8	40.4	3.9	4.3	4.3	0.0	.008	.176	.128	.048	.408	.344	.064	.014	3.2
7392	" 23	" 24	d	1	.03	307.6	298.4	9.2	47.2	38.	4.2	7.4	4.4	3.	.006	.112	.104	.008	.6	.472	.128	.016	4.6
7433	" 30	May 1	d	1	.02*.05	336.4	327.6	8.8	67.6	64.4	4.3	4.3	4.3	0.0	.016	.16	.128	.032	.548	.48	.068	.03	2.96
7472	May 7	" 8	d	c	.3	318.8	296.4	22.4	28.	26.	3.7	18.2	13.5	4.7	.044	.512	.464	.048	1.06	.9	.16	.01	1.12
7522	" 14	" 15	d	c	.3	312.	280.4	31.6	42.8	35.2	4.	15.3	10.9	4.4	.064	.544	.32	.224	1.06	1.028	.032	.015	1.24
7579	" 21	" 22	d	1	.3	330.4	292.4	38.	48.8	44.8	3.4	17.1	12.7	4.4	.056	.512	.432	.08	.964	.58	.384	.013	1.32
7613	" 28	" 29	d	1	.2	320.	276.4	43.6	40.4	40.4	3.5	13.8	9.6	4.2	.044	.368	.256	.112	.96	.8	.16	.03	3.
7650	June 4	June 5	d	c	.03	360.4	324.8	35.6	58.	51.6	4.5	7.5	5.5	2.	.024	.24	.208	.032	.52	.452	.068	.035	2.6
7696	" 11	" 12	d	c	.03	363.6	302.	61.6	45.6	44.8	3.5	9.5	6.9	2.6	.072	.272	.144	.128	.612	.452	.16	.03	4.6
7735	" 18	" 19	d	1	.05	316.	194.8	121.2	32.4	14.8	3.5	9.4	6.1	3.3	.048	.304	.192	.112	.74	.356	.384	.008	1.

*Not filtered.

CHEMICAL EXAMINATION OF WATER FROM THE KANKAKEE RIVER AT WILMINGTON.— CONTINUED.

(Parts per 1,000,000.)

Serial Number.	1900 Date of Collection.	1900 Date of Examination.	Appearance. Turbidity.	Appearance. Sediment.	Appearance. Color.	Residue on Evaporation. Total.	Residue on Evaporation. Dissolved.	Residue on Evaporation. Suspended.	Residue on Evaporation. Loss on Ignition. Total.	Residue on Evaporation. Loss on Ignition. Dissolved.	Chlorine.	Oxygen Consumed. Total.	Oxygen Consumed. By Dissolved.	Oxygen Consumed. By Suspended Matt'r	Nitrogen as Ammonia. Free Ammonia.	Nitrogen as Ammonia. Albuminoid Ammonia. Total.	Nitrogen as Ammonia. Albuminoid Ammonia. Dissolved.	Nitrogen as Ammonia. Albuminoid Ammonia. Suspended	Organic Nitrogen. Total.	Organic Nitrogen. Dissolved.	Organic Nitrogen. Suspended	Nitrogen as Nitrites.	Nitrogen as Nitrates.
7773	June 25	June 26	s	1	.03	329.6	294.8	34.8	34.4	30.4	3.4	8.7	7.5	1.2	.042	.24	.224	.016	1.06	.612	.448	.008	.92
7815	July 2	July 3	d	m	.2	261.6	235.6	26.	41.6	38.4	3.	9.	8.7	.3	.074	.24	.176	.064	.676	.58	.096	.013	.96
8108	Aug. 6	Aug. 7	d	1	.01	274.4	225.6	48.8	54.4	36.8	2.2	10.8	8.5	2.3	.114	.304	.256	.048	.644	.324	.32	.008	.76
8162	" 13	" 14	d	1	.01	271.2	231.2	40.	38.	38.8	3.4	10.7	7.7	3.	.12	.336	.304	.032	.644	.412	.232	.013	.6
8226	" 20	" 21	d	1	.02	296.8	229.2	67.1	30.	28.4	4.5	9.	5.7	3.3	.16	.288	.208	.08	.632	.38	.252	.022	.92
8336	" 30	" 31	d	1	.15	288.	194.	94.	34.	32.	2.6	10.3	5.4	4.9	.124	.272	.256	.016	.568	.452	.116	.013	1.04
8391	Sept. 6	Sept. 7	d	c	.2	313.6	266.	47.6	30.8	21.6	2.2	10.3	8.	2.3	.11	.208	.192	.016	.536	.496	.04	.01	.72
8461	" 13	" 14	d	c	.3	329.2	295.2	34.	32.8	31.6	3.	12.7	9.9	2.8	.084	.32	.288	.032	.552	.592	....	.006	.56
8514	" 21	" 22	d	1	.35	295.6	259.2	36.4	25.6	22.8	3.2	11.8	9.9	1.9	.108	.32	.272	.048	1.584	....	....	.002	.16
8564	" 27	" 28	d	c	.3	289.6	264.6	25.	31.2	24.4	3.8	8.4	7.9	.5	.094	.304	.24	.064	.524	.416	.108	.004	.32
8758	Nov. 8	Nov. 9	d	1	.03	285.6	277.6	8.	32.4	30.	3.7	6.1	5.6	.5	.062	.272	.208	.064	.512	.48	.032	.007	.233
8793	" 19	" 20	s	1	.1*.15	276.4	268.4	8.	26.	23.6	5.	6.2	6.1	.1	.12	.256	.24	.016	.72	.688	.032	.005	.755
8838	" 29	" 30	d	1	.3	314.	283.2	30.8	30.8	28.8	2.6	8.8	8.6	.2	.096	.304	.176	.128	.784	.624	.16	.013	4.187
8873	Dec. 6	Dec. 7	d	1	.3	308.8	300.4	8.4	31.2	29.2	2.8	9.1	9.	.1	.1	.24	.224	.016	.672	.576	.096	.016	3.504
8892	" 13	" 14	d	v l	.3	302.4	298.8	3.6	27.6	25.6	2.8	9.8	9.7	.1	.064	.24	.224	.016	.672	.656	.016	.013	3.387
8909	" 19	" 21	s	1	.4	325.6	318.4	7.2	42.	38.	3.	11.3	11.1	.2	.078	.272	.272	....	.816	.752	.064	.006	3.354
Average Jan. 1—June 25						350.	265.	85.	39.4	32.2	3.3	11.6	8.3	3.3	.059	.401	.254	.146	.968	.625	.342	.015	2.76
Average July 2—Dec. 19						295.5	263.1	32.4	33.9	30.	3.2	9.6	8.1	1.5	.073	.278	.235	.042	.687	.531	.157	.01	1.43
Average Jan. 7—Dec.19						329.5	264.3	65.2	37.3	31.4	3.2	10.9	8.2	2.7	.731	.355	.247	.107	.613	.576	.036	.013	2.26

The water in all cases was odorless. The Color upon ignition was brown.

*Not filtered.

CHEMICAL EXAMINATION OF WATER FROM THE FOX RIVER AT OTTAWA.
(Parts per 1,000,000.)

Serial Number.	1898 Date of Collection.	1898 Date of Examination.	Appearance. Turbidity.	Appearance. Sediment.	Appearance. Color.	Residue on Evaporation. Total.	Residue on Evaporation. Dissolved.	Residue on Evaporation. Suspended.	Residue on Evaporation. Loss on Ignition. Total.	Residue on Evaporation. Loss on Ignition. Dissolved.	Chlorine.	Oxygen Consumed. Total.	Oxygen Consumed. By Dissolved.	Oxygen Consumed. By Suspended Matt'r	Nitrogen as Ammonia. Free Ammonia.	Nitrogen as Ammonia. Albuminoid Ammonia. Total.	Nitrogen as Ammonia. Albuminoid Ammonia. Dissolved.	Nitrogen as Ammonia. Albuminoid Ammonia. Suspended	Organic Nitrogen. Total.	Organic Nitrogen. Dissolved.	Organic Nitrogen. Suspended	Nitrogen as Nitrites.	Nitrogen as Nitrates.
3320	Mar. 1	Mar. 3	d	c	.1*.15	296.4	244.4	52.	17.6	14.4	4.	12.	8.	4.	.274	.36	.32	.04	.84	.6	.24	.022	1.6
3359	" 14	" 15	d	m	.2	297.2	184.8	112.4	32.	23.2	2.3	14.3	7.5	6.8	.24	.72	.28	.44	1.16	.52	.64	.025	1.1
3389	" 22	" 24	d	c	.3	296.	212.8	83.2	27.6	26.8	1.8	14.2	8.3	5.9	.128	.6	.4	.2	1.24	.68	.56	.025	1.1
3401	" 28	" 30	d	c	.4	393.2	224.4	168.8	42.	37.2	2.4	19.9	9.	10.9	.088	.84	.48	.36	1.81	.73	1.08	.03	1.1
3433	April 4	April 6	d	c	.1*.4	323.2	265.2	58.	38.	33.2	4.4	14.	10.8	3.2	.03	.56	.4	.16	1.25	.73	.52	.014	1.
3454	" 12	" 14	d	l	.15	314.8	259.2	55.6	30.	29.2	6.	12.4	9.	3.4	.042	.56	.36	.2	.93	.77	.16	.02	.44
3471	" 18	" 19	s	c	.07	337.6	303.6	34.	38.8	33.6	7.4	12.	11.3	.7	.016	.4	.368	.032	1.17	.85	.32	.015	.6
3498	" 25	" 26	d	l	.07	287.2	278.8	8.4	34.	30.	7.	8.4	7.2	1.2	.024	.44	.32	.12	.93	.77	.16	.002	.55
3538	May 2	May 4	d	c	.05*.1	302.8	273.2	29.6	26.8	24.	10.	8.3	7.7	.6	.072	.36	.32	.04	.82	.58	.24	.008	.45
3553	" 9	" 11	s	l	.04	309.2	304.4	4.8	46.4	44.	10.8	7.7	7.4	.3	.034	.4	.36	.04	.9	.66	.24	.015	.45
3587	" 16	" 18	d	l	.03*.05	324.8	324.4	.4	71.6	70.	6.4	7.4	7.1	.3	.02	.32	.3	.02	.66	.58	.08	.012	.35
3614	" 23	" 25	d	l	.03*.05	328.	300.4	27.6	33.2	27.2	4.	8.	7.4	.6	.072	.48	.32	.16	.82	.58	.24	.02	.6
3642	" 30	June 2	d	c	.03	413.6	252.	161.6	31.2	30.	4.6	15.	7.4	7.6	.086	.6	.44	.16	1.14	.66	.48	.06	.5
3667	June 6	" 6	d	l	......	388.4	354.	34.4	42.	30.	21.	7.	6.5	.5	.038	.32	.26	.06	.68	.52	.16	.027	.3
3692	" 13	" 16	d	c	......	422.4	287.2	135.2	41.6	39.2	7.	12.5	7.1	5.4	.03	.44	.38	.06	1.16	.6	.56	.05	.25
3716	" 20	" 22	s	l	.03	346.	338.4	7.6	44.	38.8	14.	6.2	5.7	.5	.036	.32	.2	.12	.8	.6	.2	.005	.35
3756	" 28	" 29	v d	m	.05	571.6	....	....	34.2	....	2.4	19.	7.6	11.4	.01	.8	.28	.52	1.88	.64	1.24	.09	.75
3791	July 6	July 7	d	l	.1*.2	289.2	246.	42.8	18.4	16.8	7.	10.7	8.8	1.9	.026	.44	.28	.16	.744	.644	.1	.01	.3
3816	" 12	" 13	d	l	.04*.1	262.4	249.6	12.8	14.8	14.4	5.6	7.5	7.	.5	.018	.36	.32	.04	.64	.56	.08	.002	.2
3836	" 18	" 19	d	l	.03*.04	259.6	257.2	2.4	16.8	15.2	5.	7.8	7.4	.4	.014	.32	.28	.04	.72	.48	.24	none	.2
3872	" 25	" 26	d	l	.02*.04	260.8	248.	12.8	22.	20.8	9.	7.5	6.9	.6	.03	.36	.32	.04	.56	.48	.08	"	.1
3898	Aug. 1	Aug. 2	d	l	.03*.04	264.8	258.	6.8	25.2	22.8	10.	7.6	7.	.6	.008	.36	.28	.08	.64	.52	.12	.003	.2
3929	" 8	" 9	s	l	.03*.04	257.2	240.4	16.8	36.	32.8	5.4	7.5	7.1	.4	.004	.4	.36	.04	.6	.48	.12	none	.1
3958	" 15	" 16	s	l	.03*.04	298.8	273.2	25.6	40.	29.2	12.	7.2	6.8	.4	.136	.4	.36	.04	.56	.48	.08	.017	.15
3992	" 23	" 25	d	l	.05*.15	287.6	265.2	22.4	42.	40.	11.	8.	6.5	1.5	.184	.4	.24	.16	.64	.4	.24	.07	.3
4009	" 29	" 30	d	l	.03*.06	296.4	273.2	23.2	35.2	29.2	11.	7.4	6.4	1.	.116	.28	.24	.04	.68	.52	.16	.3	.1
4051	Sept. 6	Sept. 7	d	l	.04	294.8	276.	18.8	32.8	30.8	14.	7.5	6.2	1.3	.066	.32	.28	.04	.56	.44	.12	.03	.05

*Not filtered.

CHEMICAL EXAMINATION OF WATER FROM THE FOX RIVER AT OTTAWA.—CONTINUED
(Parts per 1,000,000.)

Serial Number.	1898 Date of Collection.	1898 Date of Examination.	Appearance. Turbidity.	Appearance. Sediment.	Appearance. Color.	Residue on Evaporation. Total.	Residue on Evaporation. Dissolved.	Residue on Evaporation. Suspended.	Loss on Ignition. Total.	Loss on Ignition. Dissolved.	Chlorine.	Oxygen Consumed. Total.	Oxygen Consumed. By Dissolved.	Oxygen Consumed. By Suspended Matt'r	Nitrogen as Ammonia. Free Ammonia.	Albuminoid Ammonia. Total.	Albuminoid Ammonia. Dissolved.	Albuminoid Ammonia. Suspended	Organic Nitrogen. Total.	Organic Nitrogen. Dissolved.	Organic Nitrogen. Suspended	Nitrogen as Nitrites.	Nitrogen as Nitrates.
4078	Sept. 12	Sept. 15	d	c	.04*.08	309.2	294.	15.2	52.	48.8	16.	7.8	6.3	1.5	.124	.36	.28	.08	.8	.52	.28	.045	.2
4104	" 21	" 22	d	l	.03*.04	301.2	288.	13.2	48.	42.	11.	7.7	6.5	1.2	.072	.4	.32	.08	.6	.44	.16	.025	.2
4135	" 27	" 29	d	l	.03*.05	311.2	307.6	3.6	47.2	42.8	12.	7.	5.7	1.3	.074	.32	.2	.12	.52	.36	.16	.04	.5
4169	Oct. 4	Oct. 5	d	c	.....	329.2	319.2	10.	57.6	44.	12.	5.7	5.5	.2	.13	.24	.2	.04	.44	.36	.08	.025	.35
4188	" 10	" 11	d	l	.04*.08	328.8	298.8	30.	55.6	52.	11.	6.5	5.8	.7	.116	.28	.22	.06	.48	.4	.08	.035	.4
4237	" 19	" 21	s	l	.05*.08	306.	302.8	3.2	31.2	30.	10.	5.9	5.6	.3	.066	.224	.192	.032	.4	.3[?]8	.062	.007	.25
4266	" 26	" 27	d	m	.07	455.6	246.	209.6	44.8	24.	5.	14.9	6.6	8.3	.064	.6	.24	.36	1.17	.49	.68	.012	.8
4315	Nov. 2	Nov. 4	d	l	.02*.04	364.8	352.	12.8	54.	50.	6.	6.5	5.3	1.2	.04	.24	.16	.08	.53	.37	.16	.015	.4
4343	" 9	" 10	d	l	.06*.15	340.	330.	10.	44.	40.	7.	6.1	5.2	.9	.076	.44	.28	.16	.91	.75	.16	.011	.5
4370	" 15	" 16	d	l	.02*.04	350.	332.	18.	38.	36.	4.8	5.3	4.6	.7	.004	.192	.144	.048	.47	.35	.12	.005	.9
4407	" 23	" 24	s	l	.03*.05	392.	374.	18.	44.	42.	6.	6.1	5.3	.8	.01	.224	.176	.048	.63	.43	.2	.014	.9
4439	" 30	Dec. 1	d	l	.03*.04	383.2	370.8	12.4	53.2	49.2	6.8	5.7	5.	.7	.024	.28	.176	.104	.53	.41	.12	.007	.8
4465	Dec. 7	" 8	s	l	.03*.06	392.8	382.	10.8	66.	60.8	7.	7.5	5.4	2.1	.036	.256	.176	.08	.69	.49	.2	.006	.2
4486	" 12	" 15	s	l	.03	434.	422.8	11.2	68.	66.	8.4	6.5	5.6	.9	.026	.224	.208	.016	.61	.49	.12	.01	.25
4514	" 21	" 22	d	c	.4	308.8	270.8	38.	56.	54.	6.	16.5	13.8	2.7	.024	.72	.432	.288	1.37	.97	.4	.035	.2
4537	" 26	" 28	d	l	.1*.2	316.	298.8	17.2	52.	48.	7.	9.4	8.6	.8	.064	.36	.24	.12	.73	.57	.16	.01	.25
Average March 1—June 28						376.	259.5	116.4	37.1	31.2	6.7	11.6	7.9	3.7	.072	.501	.34	.16	1.07	.651	.41	.025	.67
Average July 6—Dec. 26						322.8	299.1	23.7	42.1	37.7	8.6	7.8	6.5	1.2	.059	.346	.254	.092	.662	.49	.172	.028	.33
Average March 1—Dec. 26						333.6	281.	52.6	40.1	35.1	7.9	9.3	7.	2.2	.064	.407	.288	.119	.823	.553	.269	.027	.47

*Not Filtered.

CHEMICAL EXAMINATION OF WATER FROM THE FOX RIVER AT OTTAWA.
(Parts per 1,000,000.)

Serial Number.	1899 Date of		Appearance.			Residue on Evaporation.					Chlorine.	Oxygen Consumed.			Nitrogen as Ammonia				Organic Nitrogen.			Nitrogen as	
									Loss on Ignition.							Albuminoid Ammonia.							
	Collection.	Examination.	Turbidity.	Sediment.	Color.	Total.	Dissolved.	Suspended.	Total.	Dissolved.		Total.	By Dissolved.	By Suspended Matt'r	Free Ammonia.	Total.	Dissolved.	Suspended	Total.	Dissolved.	Suspended	Nitrites.	Nitrates.
5113	May 29	May 30	v	v	.06	1060.4	244.	816.4	65.6	30.4	.3	35.5	9.8	25.7	.12	1.92	.32	1.6	5.53	.73	4.8	.05	1.68
5163	June 5	June 6	v	c	.2	459.6	306.4	153.2	44.4	40.8	1.	15.	9.5	5.5	.128	.64	.304	.336	1.61	.826	.784	.08	.92
5207	" 12	" 14	d	l	.1	335.2	306.	29.2	24.	24.	2.	10.5	9.3	1.2	.048	.448	.32	.128	1.16	.952	.208	.015	.72
5241	" 19	" 20	d	l	.1*.15	321.6	306.	15.6	36.	35.2	2.5	9.5	9.3	.2	.048	.352	.272	.08	.68	.536	.144	.001	.2
5294	" 26	" 27	d	l	.05	320.4	311.6	8.8	39.2	30.8	4.	9.4	9.3	.1	.04	.256	.24	.016	.84	.536	.304	none	.08
5335	July 3	July 4	d	l	.05*.8	309.2	305.2	4.	37.6	32.4	5.	7.7	7.4	.3	.04	.312	.212	.1	1.	.652	.348	.002	.16
5385	" 10	" 11	d	l	.1*.15	297.2	184.8	112.4	54.8	54.4	6.2	9.	8.6	.4	.048	.32	.24	.08	.84	.504	.336	none	.24
5433	" 17	" 18	d	c	.3	420.	282.4	137.6	62.	39.2	4.5	16.8	10.2	6.6	.092	.896	.368	.528	1.8	.792	1.008	.045	1.28
5480	" 24	" 25	s	l	.25	238.4	220.	18.4	56.4	49.6	4.1	11.4	10.3	1.1	.016	.512	.288	.224	1.16	.632	.528	.005	.2
5535	" 31	Aug. 2	s	l	.15*.3	282.4	278.8	3.6	130.8	64.8	5.2	10.3	10.3	0.0	.044	.352	.32	.032	.76	.664	.096	.001	.2
5580	Aug. 7	" 8	d	l	.05	296.4	272.4	24.	64.8	61.6	5.3	11.5	10.2	1.3	.012	.448	.288	.16	.92	.536	.384	none	.16
5632	" 14	" 15	s	c	.05*.15	293.6	282.8	10.8	76.	66.	4.8	9.5	8.8	.7	.08	.352	.288	.064	.76	.6	.16	"	.2
5678	" 21	" 22	s	l	.1*.12	285.2	280.8	4.4	58.	....	5.8	10.4	9.8	.6	.036	.448	.416	.032	.76	.68	.08	"	.16
5733	" 28	" 29	d	l	.04	304.	290.4	13.6	55.2	54.8	6.	19.9	19.4	.5	.036	.384	.272	.112	.76	.6	.16	"	.04
5797	Sept. 4	Sept. 6	d	l	.03	311.2	306.8	4.4	50.8	49.2	6.7	8.9	7.1	1.8	.04	.336	.288	.048	.824	.376	.448	.001	.2
5838	" 11	" 12	s	l	.08*.15	279.2	270.	9.2	45.6	38.8	6.1	8.8	8.8	0.0	.02	.32	.288	.032	.728	.536	.192	none	.12
5880	" 18	" 19	s	l	.02*.04	291.6	277.6	14.	62.	60.8	6.15	7.9	6.1	1.8	.024	.352	.256	.096	.76	.6	.16	"	.08
5939	" 25	" 26	d	l	.04	298.8	297.2	1.6	46.	44.	7.2	8.2	7.	1.2	.02	.368	.276	.092	.704	.532	.172	"	.16

* Not filtered.

CHEMICAL EXAMINATION OF WATER FROM THE FOX RIVER AT OTTAWA.—CONTINUED.
(Parts per 1,000,000.)

Serial Number.	1899 Date of		Appearance.			Residue on Evaporation.					Chlorine.	Oxygen Consumed.			Nitrogen as Ammonia				Organic Nitrogen.			Nitrogen as	
	Collection.	Examination.	Turbidity.	Sediment.	Color.	Total.	Dissolved.	Suspended.	Loss on Ignition. Total.	Loss on Ignition. Dissolved.		Total.	By Dissolved.	By Suspended Matt'r	Free Ammonia.	Albuminoid Ammonia. Total.	Albuminoid Ammonia. Dissolved.	Albuminoid Ammonia. Suspended	Total.	Dissolved.	Suspended	Nitrites.	Nitrates.
5996	Oct. 3	Oct. 4	d	1	.05	308.8	296.8	12.	68.8	57.2	7.7	8.9	7.6	1.3	.046	.304	.192	.112	.548	.42	.128	none	.28
6033	" 9	" 10	d	1	.04*.05	309.2	308.	1.2	38.	38.	7.4	7.1	7.	.1	.02	.264	.256	.008	.644	.596	.048	.001	.12
6083	" 16	" 18	d	1	.02*.04	326.	318.8	7.2	52.4	51.2	8.	7.	6.9	.1	.128	.416	.336	.08	.648	.488	.16	.001	.24
6152	" 23	" 25	s	1	.05*.1	318.	308.8	9.2	37.6	33.2	7.7	6.6	6.6	0.0	.032	.288	.256	.032	.44	.36	.08	none	.44
6199	" 30	Nov. 1	s	1	.04*.05	320.	299.6	20.4	14.	....	7.6	6.2	6.2	0.0	.024	.288	.256	.032	.456	.408	.048	.008	.28
6240	Nov. 6	" 7	d	1	.03*.04	315.2	300.8	14.4	46.	41.6	7.2	5.9	5.8	.1	.032	.304	.272	.032	.584	.52	.064	.002	.24
6278	" 13	" 14	s	1	.03*.05	337.6	328.8	8.8	38.8	32.4	7.	4.6	4.5	.1	.012	.352	.208	.144	.488	.296	.192	none	.08
6336	" 20	" 21	s	1	.02*.03	315.6	312.	3.6	36.	34.8	7.7	5.5	5.3	.2	.024	.304	.256	.048	.616	.552	.064	.003	.24
6402	" 27	" 28	s	1	.02*.03	312.4	309.6	2.8	57.2	56.4	8.	5.	...	...	.02	.224	.16	.064	.456	.36	.096	.012	.4
6505	Dec. 11	Dec. 14	s	1	.02	330.4	326.4	4.	60.4	58.4	7.6	6.2	6.2	0.0	.16	.272	.256	.016	.616	.488	.128	.01	.56
6574	" 21	" 23	d	1	.02*.03	328.4	324.8	3.6	40.4	40.	7.6	6.9	6.8	.1	.168	.224	.224	.00	.6	.48	.12	.01	.72
6594	" 28	" 29	d	1	.02*.03	420.8	418.	2.8	88.	36.8	9.	7.1	6.7	.4	.12	.224	.176	.048	.52	.424	.096	.004	.8
Average May 29—June 26						499.4	294.8	204.6	41.8	32.2	2.	15.9	9.4	6.5	.076	.723	.291	.432	1.964	.716	1.248	.029	.72
Average July 3—Dec. 28						313.9	296.	17.9	55.1	48.1	6.6	8.6	7.7	.9	.051	.354	.265	.088	.735	.523	.211	.004	.3
Average May 29—Dec. 28						344.8	295.8	49.	52.8	45.	5.8	9.9	8.3	1.7	.055	.416	.270	.145	.94	.555	.384	.008	.37

Not filtered.

CHEMICAL EXAMINATION OF WATER FROM THE FOX RIVER AT OTTAWA.

(Parts per 1,000,000.)

Serial Number.	1900 Date of Collection.	1900 Date of Examination.	Appearance. Turbidity.	Appearance. Sediment.	Appearance. Color.	Residue on Evaporation. Total.	Residue on Evaporation. Dissolved.	Residue on Evaporation. Suspended.	Residue on Evaporation. Loss on Ignition. Total.	Residue on Evaporation. Loss on Ignition. Dis-solved.	Chlorine.	Oxygen Consumed. Total.	Oxygen Consumed. By Dis-solved.	Oxygen Consumed. By Suspended Matt'r	Nitrogen as Ammonia. Free Ammonia.	Nitrogen as Ammonia. Albuminoid Ammonia. Total.	Nitrogen as Ammonia. Albuminoid Ammonia. Dis-solved.	Nitrogen as Ammonia. Albuminoid Ammonia. Sus-pended	Organic Nitrogen. Total.	Organic Nitrogen. Dissolved.	Organic Nitrogen. Suspended	Nitrogen as Nitrites.	Nitrogen as Nitrates.
6629	Jan. 4	Jan. 5	d	l	.03	460.	450.	10.	81.2	76.4	9.9	6.8	6.4	.4	.072	.224	.208	.016	.68	.52	.16	.006	.56
6678	" 11	" 12	s	l	.02*.03	318.8	307.2	11.6	49.2	42.4	6.5	4.5	4.3	.2	.084	.176	.16	.016	.56	.352	.208	.009	.32
6725	" 18	" 20	d	l	.02*.03	311.6	310.4	1.2	60.4	60.	7.3	4.5	4.5	.0	.092	.176	.128	.048	.48	.32	.16	.013	.56
6772	" 25	" 27	s	c	.15	292.4	258.8	33.6	44.4	36.4	4.5	8.3	7.6	.7	.32	.352	.32	.032	.88	.672	.208	.022	1.52
7076	Mar. 12	Mar. 14	d	m	.5	202.8	160.4	42.4	29.6	23.2	3.8	11.6	8.2	3.4	.324	.352	.288	.064	1.04	.608	.432	.012	.72
7128	" 20	" 22	d	c	.3	218.	178.4	39.6	19.2	16.4	3.6	9.4	8.7	.7	.332	.352	.256	.096	.84	.728	.112	.014	.84
7175	" 27	" 29	d	m	.3	281.6	173.6	108.	30.8	26.	3.1	15.1	9.4	5.7	.38	.376	.256	.32	1.24	.632	.608	.015	.68
7232	April 3	Apr. 5	d	m	.3	626.8	131.2	493.6	34.	17.2	2.8	23.5	9.4	14.1	.26	1.024	.288	.736	2.2	.792	1.408	.022	1.6
7288	" 10	" 12	d	c	.15	286.4	199.2	87.2	31.2	22.	2.2	11.	9.	2.	.144	.512	.24	.272	1.08	.664	.416	.02	1.16
7340	" 17	" 19	d	c	.03	297.2	226.8	70.4	35.6	33.2	3.8	9.6	9.	.6	.064	.432	.208	.224	1.08	.6	.48	.018	.76
7408	" 24	" 26	d	c	....	302.8	256.8	46.	28.8	28.	4.	11.2	8.8	2.4	.072	.64	.288	.352	1.368	.792	.576	.011	.32
7449	May 1	May 3	d	c	.06	302.8	250.	52.8	36.4	30.	4.8	15.8	9.8	6.	.024	.64	.368	.272	1.188	.708	.48	.001	.2
7489	" 8	" 10	d	c	.04	402.8	251.2	151.6	32.	30.	4.6	15.5	10.3	5.2	.052	.592	.288	.304	1.16	.612	.548	.015	.36
7547	" 15	" 17	..	..	.1	300.8	285.2	15.6	52.8	51.2	6.6	8.9	8.5	.4	.96	.544	.288	.156	.9	.568	.332	.002	.04
7599	" 22	" 24	d	c	.05	294.	266.	28.	53.2	52.	5.3	9.4	8.4	1.	.132	.368	.224	.144	.804	.42	.384	none	.12
7670	June 5	June 6	d	l	.02	299.2	292.8	6.4	47.6	46.8	5.4	7.9	7.7	.2	.088	.256	.224	.032	.68	.468	.212	.011	.32
7702	" 11	" 13	d	l	.03	326.8	312.	14.8	50.4	41.6	5.3	9.3	8.3	1.	.04	.336	.288	.048	.708	.52	.188	.001	.24
7745	" 18	" 20	d	l	.02	322.4	312.8	9.6	47.6	47.2	6.5	6.8	6.8	....	.052	.224	.192	.032	.452	....	.....	.008	.24
7786	" 25	" 27	d	m	.01	301.2	293.2	8.	36.8	30.4	5.6	6.5	6.5	....	.072	.368	.304	.064	.42	.296	.124	.001	.36
7820	July 2	July 4	d	l	.25	321.2	318.4	2.8	42.4	40.	5.4	7.1	7.	.1	.04	.272	.24	.032	.452	.308	.144	.013	.16

CHEMICAL EXAMINATION OF WATER FROM THE FOX RIVER AT OTTAWA.—CONTINUED.
(Parts per 1,000,000.)

Serial Number.	1900 Date of Collection.	1900 Date of Examination.	Appearance. Turbidity.	Appearance. Sediment.	Appearance. Color.	Residue on Evaporation. Total.	Residue on Evaporation. Dissolved.	Residue on Evaporation. Suspended.	Loss on Ignition. Total.	Loss on Ignition. Dissolved.	Chlorine.	Oxygen Consumed. Total.	Oxygen Consumed. By Dissolved.	Oxygen Consumed. By Suspended Matt'r	Nitrogen as Ammonia. Free Ammonia.	Albuminoid Ammonia. Total.	Albuminoid Ammonia. Dissolved.	Albuminoid Ammonia. Suspended	Organic Nitrogen. Total.	Organic Nitrogen. Dissolved.	Organic Nitrogen. Suspended	Nitrogen as Nitrites.	Nitrogen as Nitrates.
7892	July 9	July 11	d	1	.2	304.	300.	4.	52.4	48.8	5.2	7.	6.8	.2	.086	.192	.16	.032	.516	.42	.096	.005	.16
7937	" 16	" 17	d	1	.02	313.6	288.4	25.2	37.6	25.6	7.6	7.	6.3	.7	.072	.272	.208	.064	.564	.452	.112	.005	.12
7996	" 23	" 24	d	1	.02	316.	282.4	33.6	54.4	42.	6.4	7.9	6.5	1.4	.12	.304	.144	.16	.548	....	....	.002	.2
8047	" 30	" 31	d	m	.02	302.	263.	39.	45.2	30.	6.6	9.2	8.1	1.1	.072	.352	.24	.112	.564	.388	.176	.005	.08
8137	Aug. 6	Aug. 9	d	1	.02	358.	286.	72.	64.8	....	6.2	12.1	7.6	4.5	.172	.512	.32	.192	.836	.564	.272	.005	.16
8171	" 13	" 15	d	1	.02	294.8	255.6	39.2	60.4	53.2	5.5	7.9	7.5	.4	.132	.368	.304	.064	.548	.46	.088	.002	.28
8243	" 20	" 22	d	1	.02	301.2	234.4	68.8	43.6	34.4	5.	8.9	6.1	2.8	.168	.352	.224	.128	.796	.212	.584	.036	.68
8296	" 27	" 28	d	1	.02	440.4	266.8	173.6	41.6	24.8	6.2	13.2	6.7	6.5	.186	.384	.144	.24	1.116	.28	.736	.001	.24
8366	Sept. 4	Sept. 5	d	c	.05	297.6	270.	27.6	30.4	22.	4.4	8.9	5.8	3.1	.11	.324	.272	.052	.488	.38	.108	.006	.28
8433	" 10	" 11	d	1	.2	304.4	281.2	23.2	46.	34.8	4.8	8.8	7.2	1.6	.132	.432	.32	.102	.604	.576	.028	.003	.28
8485	" 17	" 18	s	1	.01*.05	271.2	267.2	3.6	47.6	34.8	5.	9.8	7.9	1.9	.064	.4	.224	.176	1.34	.672	.668	.002	.16
8537	" 24	" 25	d	1	.05*.3	296.	280.4	15.6	46.8	41.6	5.4	8.3	7.8	.5	.162	.352	.224	.128	.488	....	....	.003	.24
8596	Oct. 1	Oct. 2	s	1	.2*.1	304.	288.8	15.2	55.6	40.	5.8	8.	7.6	.4	.084	.48	.288	.193	.48	....	....	none	.16
8635	" 6	" 8	vs	v 1	.01*.02	299.6	291.6	8.	46.	35.6	5.6	8.8	7.7	1.1	.142	.432	.416	.016	.64	.512	.128	.002	.038
Average Jan. 4—June 25						323.6	258.7	64.8	42.1	37.3	5.	10.2	7.9	2.2	.142	.428	.257	.171	.934	.54	.394	.011	.57
Average July 2—Oct. 2						308.2	278.1	30.1	47.6	38.7	5.7	8.8	7.1	1.7	.115	.361	.248	.113	.665	.428	.237	.006	.215
Average Jan. 4—Oct. 25						319.1	267.3	51.8	44.5	37.9	5.3	9.6	7.5	2.1	.13	.399	.253	.145	.815	.49	.324	.008	.416

CHEMICAL EXAMINATION OF WATER FROM THE FOX RIVER AT OTTAWA.
(Parts per 1,000,000.)

Serial Number.	1901 Date of Collection.	1901 Date of Examination.	Appearance. Turbidity.	Appearance. Sediment.	Appearance. Color.	Residue on Evaporation. Total.	Residue on Evaporation. Dissolved.	Residue on Evaporation. Suspended.	Loss on Ignition. Total.	Loss on Ignition. Dissolved.	Chlorine.	Oxygen Consumed. Total.	Oxygen Consumed. By Dissolved.	Oxygen Consumed. By Suspended Matt'r	Nitrogen as Ammonia. Free Ammonia.	Albuminoid Ammonia. Total.	Albuminoid Ammonia. Dissolved.	Albuminoid Ammonia. Suspended	Organic Nitrogen. Total.	Organic Nitrogen. Dissolved.	Organic Nitrogen. Suspended	Nitrogen as Nitrites.	Nitrogen as Nitrates.
9306	Aug. 16	Aug. 19	d	1	.05	306.	271.2	34.8	53.6	43.6	17.	9.7	9.2	.5	.164	.288	.256	.032	.72	.688	.032	.08	.56
9333	" 29	" 30	d	1	.1	298.4	274.	24.4	44.8	50.	16.5	8.	7.2	.8	.192	.352	.288	.064	.912	.608	.304	.075	.445
9354	Sept. 6	Sept. 7	d	1	.02	288.8	286.8	2.	31.6	44.	18.	8.1	7.4	.7	.144	.32	.16	.16	.944	.688	.256	.055	.425
9369	" 12	" 14	d	c	.02	315.6	271.2	44.4	32.	32.	14.	8.7	7.9	.8	.24	.336	.272	.064	....	....	....	.065	.495
9413	" 26	" 28	d	c	.1	308.8	292.	16.8	51.6	63.6	14.	7.5	7.2	.3	.128	.336	.24	.096	....	....	....	.03	.45
9434	Oct. 3	Oct. 5	d	1	.15	325.6	308.8	16.8	41.6	44.8	19.	8.7	8.6	.1	.128	.352	.336	.016	....	....	....	.017	.463
9474	" 10	" 14	d	c	.04	317.2	304.8	12.4	48.4	55.2	17.	8.3	...	..	.16	.304	.288	.016	....	....	....	.04	.44
9556	" 22	" 23	d	1	.05	332.	299.2	32.8	64.4	50.	15.	7.	6.2	.8	.048	.288	.272	.016	....	....	....	.017	.663
9616	" 29	" 30	d	1	.1	312.	310.4	1.6	68.4	64.4	16.	7.6	6.8	.8	.16	.32	.224	.096	....	....	....	.014	.386
Average Aug. 16—Oct. 29						311.3	291.1	20.2	48.5	49.7	16.3	8.1	6.8	1.3	.151	.321	.259	.062	.858	.661	.197	.043	.481

CHEMICAL EXAMINATION OF WATER FROM THE KANKAKEE RIVER AT WILMINGTON.
(Parts per 1,000,000.)

Serial Number.	1897 Date of		Appearance.			Residue on Evaporation.					Chlorine.	Oxygen Consumed.			Nitrogen as Ammonia				Organic Nitrogen.			Nitrogen as	
	Collection.	Examination.	Turbidity.	Sediment.	Color.	Total.	Dissolved.	Suspended.	Loss on Ignition. Total.	Loss on Ignition. Dissolved.		Total.	By Dissolved.	By Suspended Matt'r	Free Ammonia.	Albuminoid Ammonia. Total.	Albuminoid Ammonia. Dissolved.	Albuminoid Ammonia. Suspended	Total.	Dissolved.	Suspended	Nitrites.	Nitrates.
1804	Jan. 8	Jan. 9	v d	m	.6	391.6	219.2	172.4	25.2	15.2	2.2	19.7	12.2	7.5	.024	.8	.48	.32	1.44	.88	.56	.033	2.5
1817	" 12	" 13	d	1	…	271.2	251.6	19.6	20.8	14.	2.5	11.7	….	….	.024	.28	….	….	.88	….	….	.02	3.4
1836	" 19	" 20	d	c	…	290.4	244.8	45.6	14.8	12.8	2.2	13.1	….	….	.026	.32	….	….	.8	….	….	.012	2.6
1862	" 30	Feb. 1	s	1	.4	269.6	268.8	.8	12.4	11.2	2.8	12.5	….	….	.022	.24	….	….	.88	….	….	.006	2.2
1905	Feb. 10	" 12	s	1	.4	280.	268.4	11.6	14.4	14.	2.5	12.3	….	….	.06	.36	….	….	.88	….	….	.012	1.7
1924	" 16	" 18	d	1	.25	273.2	259.2	14.	9.6	6.8	3.	9.3	….	….	.07	.32	….	….	.64	….	….	.01	1.8
1934	" 22	" 24	d	c	…	422.	195.2	226.8	44.	24.	1.6	14.8	….	….	.046	.56	….	….	1.36	….	….	.055	2.4
1979	Mar. 8	Mar. 10	d	c	…	301.6	182.8	118.8	38.8	30.4	2.	13.9	….	….	.052	.4	….	….	.83	….	….	.035	1.7
1990	" 12	" 13	vd	m	.4	644.	176.	408.	75.2	38.8	2.6	36.	8.6	27.4	.028	1.32	.224	1.096	2.48	.63	1.65	.045	2.4
2020	" 16	" 18	d	c	…	240.4	193.2	47.2	44.	41.2	1.5	12.7	….	….	.028	.4	….	….	.71	….	….	.045	2.1
2045	" 25	" 26	d	c	…	229.2	190.	39.2	34.4	30.	1.8	12.2	….	….	.002	.32	….	….	.75	….	….	.02	2.
2064	" 31	Apr. 1	d	1	.4	214.	193.2	20.8	29.2	28.	1.6	11.9	….	….	.004	.32	….	….	.75	….	….	.003	1.8
2099	Apr. 7	" 8	d	1	.4	222.4	211.2	11.2	35.2	21.2	1.6	12.6	….	….	.018	.36	….	….	.83	….	….	.003	1.4
2200	May 10	May 11	d	1	.2	286.8	261.2	25.6	26.8	21.2	2.	4.9	….	….	.016	.36	….	….	1.03	….	….	.008	1.3
Average Jan. 8—May 10…………………						309.	222.4	87.3	30.3	22.	2.1	14.8	10.4	17.4	.03	.45	.352	.708	1.01	.85	1.1	.021	2.09

The water in all cases was odorless. The color upon ignition was brown.

CHEMICAL EXAMINATION OF WATER FROM THE SPOON RIVER AT HAVANA.

(Parts per 1,000,000.)

Serial Number.	1897. Date of Collection.	1897. Date of Examination.	Appearance. Turbidity.	Appearance. Sediment.	Appearance. Color.	Residue on Evaporation. Total.	Residue on Evaporation. Dissolved.	Residue on Evaporation. Suspended.	Residue on Evaporation. Loss on Ignition. Total.	Residue on Evaporation. Loss on Ignition. Dissolved.	Chlorine.	Oxygen Consumed. Total.	Oxygen Consumed. By Dissolved.	Oxygen Consumed. By Suspended Matt'r	Nitrogen as Ammonia. Free Ammonia.	Nitrogen as Ammonia. Albuminoid Ammonia. Total.	Nitrogen as Ammonia. Albuminoid Ammonia. Dissolved.	Nitrogen as Ammonia. Albuminoid Ammonia. Suspended	Organic Nitrogen. Total.	Organic Nitrogen. Dissolved.	Organic Nitrogen. Suspended	Nitrogen as Nitrites.	Nitrogen as Nitrates.
1799	Jan. 5	Jan. 6	v d	m	.8	1462.	160.4	1301.6	22.	10.	2.	37.5	8.9	28.6	.292	1.28	.32	.96	6.4	.88	5.52	.027	1.
1822	" 13	" 13	d	c	...	428.	302.	126.	26.	8.	2.6	8.6	....	....	.104	.28	....	......	.56	...	....	.025	3.7
1842	"	" 20	v d	m	...	632.8	202.4	430.4	19.6	16.	2.4	16.8	....	....	.236	.6	....	......	1.28	. ..	....	.085	2.7
1848	" 26	" 27	s	l	.15	315.2	307.2	8.	17.6	11.6	4.2	4.	....	....	.152	.16	....	......	.48	...	....	.018	3.6
1878	Feb. 1	Feb. 3	s	l	.03	353.2	351.2	2.	28.8	24.	3.4	2.3	....	....	.126	.08	....	......	.32	...	....	.004	3.6
1901	" 9	" 10	d	c	...	319.2	203.2	116.	16.4	12.8	2.8	16.3	....	....	.412	.52	....	......	1.28	...	....	.038	1.8
1922	" 16	" 17	d	c	...	367.2	360.4	6.8	16.8	16.	3.5	7.9	....	....	.244	.32	....	......	.72	...	....	.06	2.5
1940	" 23	" 24	v d	m	.5	2285.2	197.6	2087.6	221.2	32.	1.4	82.8	11.1	71.7	.176	3.52	.48	3.04	7.2	1.2	6.	.045	2.3
1961	Mar. 2	Mar. 3	d	l	...	359.6	308.	51.6	36.4	29.2	3.1	5.1	....	....	.162	.2	....	......	.47	...	....	.06	3.
1982	" 9	" 10	v d	v m	.5	1000.8	168.	832.8	75.6	38.	1.2	36.	9.5	26.5	.328	1.36	.304	1.056	2.51	.83	1.68	.055	1.3
2017	" 16	" 17	d	m	.3	699.2	238.4	460.8	80.8	40.8	2.8	27.8	7.3	20.5	.192	1.08	.224	.856	1.95	.51	1.44	.04	2.5
2041	" 24	" 24	d	m	.4	950.8	214.8	736.	111.2	20.2	1.2	46.8	11.	35.8	.152	1.6	.272	1.328	2.83	.83	2.	.06	2.4
2059	" 30	" 31	v d	c	...	258.	229.2	28.8	36.8	29.6	4.3	9.8	....	....	.26	.36	....	......	.67	...	....	.062	2.4
2094	April 6	Apr. 7	v d	m	...	374.	215.2	158.8	39.2	22.	2.8	14.6	....	....	.094	.44	....	......	.91	...	....	.046	2.2
2118	" 13	" 14	v d	c	...	408.4	288.4	120.	39.6	32.2	3.	7.3	....	....	.044	.28	....	......	.51	...	....	.04	3.2
2133	" 20	" 21	d	l	...	353.2	311.2	42.	55.2	54.	3.	5.3	....	....	.024	.24	....	......	.43	...	....	.03	3.5
2161	" 28	" 28	d	c	...	465.2	261.2	204.	40.8	34.	3.1	15.8	....	....	.014	.52	....	......	.95	...	....	.08	.9
2190	May 4	May 5	d	c	.	321.2	292.	29.2	37.2	34.	3.2	5.4	....	....	.028	.2	....	......	.39	...	....	.034	2.8
2208	" 11	" 12	v d	l	.1	319.2	284.8	34.4	25.6	24.	3.3	5.6	....	....	.064	.36	....	......	.71	...	....	.028	2.2
2231	" 18	" 19	d	l	.15	288.	262.	26.	36.4	29.2	3.7	6.4	....	....	.028	.36	....	......	.67	...	....	.025	1.6
2258	" 25	" 26	d	c	...	311.2	278.8	32.4	36.	34.	3.4	6.3	....	....	.072	.4	....	......	.83	...	....	.035	.8
2286	June 1	June 2	d	c	...	317.2	263.6	43.6	29.6	26.4	3.2	7.5	....	....	.078	.52	....	......	1.	...	....	.035	1.3
2307	" 8	" 9	d	c	...	327.2	283.6	43.6	31.2	30.	3.5	7.	....	....	.08	.44	....	......	.97	...	....	.06	.6
2332	" 15	" 16	d	c	...	351.2	296.	55.2	30.	20.	3.	7.7	....	....	.102	.4	....	......	.97	...	....	.05	.2
2366	" 22	" 23	d	c	...	353.2	296.	57.2	26.	18.	3.6	7.5	....	....	.034	.48	....	......	.93	...	....	.04	.7
2387	" 29	" 30	d	c	...	338.	306.	32.	27.2	26.	3.4	5.3	....	....	.04	.24	....	......	.65	...	....	.045	.45
2420	July 6	July 7	v d	v m	...	2930.	187.6	2742.4	106.	20.4	.6	35.8	8.	27.8	.068	2.4	.4	2.	4.76	.84	3.92	.12	.24

CHEMICAL EXAMINATION OF WATER FROM THE SPOON RIVER AT HAVANA.—CONTINUED.
(Parts per 1,000,000.)

Serial Number.	1897 Date of Collection.	1897 Date of Examination.	Appearance. Turbidity.	Appearance. Sediment.	Appearance. Color.	Residue on Evaporation. Total.	Residue on Evaporation. Dissolved.	Residue on Evaporation. Suspended.	Loss on Ignition. Total.	Loss on Ignition. Dissolved.	Chlorine.	Oxygen Consumed. Total.	Oxygen Consumed. By Dissolved.	Oxygen Consumed. By Suspended Matt'r	Nitrogen as Ammonia. Free Ammonia.	Albuminoid Ammonia. Total.	Albuminoid Ammonia. Dissolved.	Albuminoid Ammonia. Suspended	Organic Nitrogen. Total.	Organic Nitrogen. Dissolved.	Organic Nitrogen. Suspended	Nitrogen as Nitrites.	Nitrogen as Nitrates.
2442	July 13	July 14	d	c	.7	361.6	308.4	53.2	22.8	16.4	2.6	11.2	7.4	3.8	.07	.44	.32	.12	.92	.84	.08	.09	1.5
2473	" 21	" 21	d	l	.05	298.	276.	22.	18.	16.	3.5	6.7	5.8	.9	.1	.72	.32	.4	1.	.52	.48	.045	.7
2496	" 28	" 28	v d	m	.9	368.	220.	148.	20.	10.	2.2	13.	7.5	5.5	.036	.48	.384	.096	.84	.68	.16	.19	.9
2528	Aug. 4	Aug. 4	d	c	...	298.8	235.	62.8	14.	14.	2.2	18.4	...	...	.126	.24	....	....	.8	...	...	.065	.65
2546	" 11	" 11	d	c	...	314.	223.2	90.8	21.2	16.	2.1	12.6	...	...	.186	.8	....	....	1.24	...	...	.25	.8
2573	" 18	" 18	d	c	...	281.2	220.	61.2	13.2	12.	2.5	10.	...	...	.18	.4	....	....	.92	...	...	.095	.65
2594	" 25	" 25	d	c	...	312.	311.2	.8	15.2	9.2	2.5	8.	...	...	.226	.36	....	....	.58	...	...	.015	.3
2618	Sept. 1	Sept. 1	d	c	...	322.4	282.	40.4	20.4	18.	2.7	9.8	...	...	.214	.36	....	....	.82	...	...	.025	.15
2645	" 8	" 8	d	c	...	342.	276.8	65.2	16.	12.8	2.8	11.	...	...	.226	.48	....	....	.74	...	...	.04	.2
2674	" 15	" 15	d	c	...	380.	291.2	88.8	20.	18.	3.4	12.8	...	...	.408	.6	....	....	.98	...	...	.013	.5
2699	" 22	" 22	d	c	...	353.2	.....	.....	13.2	....	4.8	12.2	...	...	.152	.64	....		1.14	...	...	.022	.15
2726	" 29	" 29	d	c	...	356.8	280.4	76.4	20.	6.4	2.9	11.	...	...	.208	.52	....		1.18	...	...	.017	.1
2760	Oct. 6	Oct. 6	d	c	...	340.4	286.	54.4	19.6	16.	2.6	12.3	...	...	.202	.48	....	....	1.02	...	...	.017	.1
2790	" 13	" 13	d	c	...	362.8	300.4	62.4	27.2	11.6	5.1	8.7	...	...	.38	.4	....		.94	...	...	.011	.05
2824	" 20	" 20	d	c	...	373.6	306.	67.6	20.4	19.6	16.	11.	...	...	.56	.52	....		.78	...	...	.02	.1
2846	" 27	" 27	d	c	...	344.8	320.	24.8	22.	21.2	19.	8.5	...	...	.336	.52	....	....	1.1	...	...	.2	.5
2879	Nov. 3	Nov. 3	d	l	...	325.6	290.8	34.8	24.8	24.	3.	7.9	...	...	.138	.4	....	....	.54	...	...	.015	.7
2959	" 17	" 17	d	c	...	303.6	268.	35.6	28.8	16.8	7.3	8.7	...	...	.056	.44	....	....	.94	...	...	.016	.75
2979	" 24	" 24	d	c	.1	300.	274.8	25.2	23.2	20.	3.	8.3	...	...	.012	.36	....	....	.94	...	...	none	.2
3009	" 30	Dec. 1	d	c	...	275.2	264.8	10.4	26.8	20.	3.5	5.9	...	...	.03	.4	....	....	.61	...	...	.002	.6
3039	Dec. 7	" 8	d	l	.1	326.	324.8	1.2	28.	....	6.2	7.5	...	...	.002	.52	....	...	.77	...	...	.002	1.
3066	" 14	" 15	d	c	.2	327.6	299.6	28.	30.8	27.2	4.8	7.5	...	...	.008	.32	....	....	.69	...	...	.015	.6
3083	" 21	" 23	d	l	.3	347.6	333.2	14.4	22.8	20.	6.	7.2	...	...	.012	.4	....		.65	...	...	none	.35
3101	" 28	" 29	d	l	.15	348.	339.2	8.8	20.4	18.8	4.8	7.4	...	...	.066	.32	....	....	.61	...	...	.003	.55
Average Jan. 5—June 29						383.	187.8	195.2	37.1	26.1	2.9	15.5	9.5	3.6	.072	.33	.32	1.448	1.06	.85	3.32	.013	2.04
Average July 6—Dec. 28						435.7	264.8	170.9	20.5	15.	4.6	10.5	7.1	9.4	.16	.54	.35	.204	1.02	.72	1.12	.051	.49
Average Jan. 5—Dec. 28						408.8	225.5	183.2	28.4	20.7	3.7	13.1	8.5	2.4	.148	.58	.33	1.19	1.04	.79	2.36	.047	1.28

The water in all cases was odorless. The color upon ignition was brown.

The abnormal data occasionally found result from the backing of Illinois River water into the Spoon River.

CHEMICAL EXAMINATION OF WATER FROM THE SPOON RIVER AT HAVANA.
(Parts per 1,000,000.)

Serial Number.	1898. Date of Collection.	1898. Date of Examination.	Appearance. Turbidity.	Appearance. Sediment.	Appearance. Color.	Residue on Evaporation. Total.	Residue on Evaporation. Dissolved.	Residue on Evaporation. Suspended.	Residue on Evaporation. Loss on Ignition. Total.	Residue on Evaporation. Loss on Ignition. Dissolved.	Chlorine.	Oxygen Consumed. Total.	Oxygen Consumed. By Dissolved.	Oxygen Consumed. By Suspended Matt'r	Nitrogen as Ammonia. Free Ammonia.	Nitrogen as Ammonia. Albuminoid Ammonia. Total.	Nitrogen as Ammonia. Albuminoid Ammonia. Dissolved.	Nitrogen as Ammonia. Albuminoid Ammonia. Suspended	Organic Nitrogen. Total.	Organic Nitrogen. Dissolved.	Organic Nitrogen. Suspended	Nitrogen as Nitrites.	Nitrogen as Nitrates.
3125	Jan. 4	Jan. 5	d	c	.3	312.4	301.2	11.2	32.	14.4	4.2	7.4	....	....	.226	.32	...	....	.61	...		.014	.8
3162	" 11	" 12	v d	vm	.5	659.2	273.6	385.6	30.8	18.8	4.	25.3	8.9	16.4	.28	1.12	.44	.68	2.16	.76	1.4	.2	1.03
3178	" 18	" 19	d	m	...	957.2	190.8	766.4	58.	28.	†10.5	54.8	13.	41.8	1.272	1.92	.32	1.6	4.76	.68	4.08	.125	.95
3211	" 25	" 26	d	m	.8	389.6	208.	181.6	34.8	22.8	3.	23.4	15.	8.4	.396	.8	.56	.24	1.84	.84	1.	.18	1.1
3227	Feb. 1	Feb 2	d	c	.8	282.8	224.8	58.	24.8	17.2	3.8	14.	12.1	1.9	.352	.48	.36	.12	1.	.8	.2	.08	1.6
3253	" 8	" 9	d	c	...	277.2	246.8	30.4	29.2	25.6	3.5	10.6	....	....	.4	.4	...	....	.84	.8	.04	.03	1.25
3267	" 15	" 16	v d	c	.1	906.8	145.6	761.2	44.8	24.4	.8	28.2	8.8	19.4	.36	.1	.44	.56	2.76	.58	2.2	.05	.85
3294	" 22	" 23	d	c	...	358.8	254.8	104.	21.2	14.8	3.3	9.7	....	....	.27	.36	...	....	.84	...	...	.02	.9
3315	Mar. 1	Mar. 2	d	l	.15	385.2	286.4	18.8	24.	22.4	3.7	5.1	....	....	.148	.22	...	....	.36	...	....	.017	2.1
3336	" 8	" 9	d	l	.15	311.6	272.8	38.8	26.8	21.6	4.	5.1	....	....	.2	.16	...	....	.28	...	....	.016	1.
3362	" 15	" 16	d	m	.4	689.2	228.8	460.4	66.	36.8	2.8	23.9	6.2	17.7	.2	.84	.28	.56	1.72	.52	1.2	.04	1.5
3386	" 22	" 23	v d	vm	.5	2106.	178.4	1927.6	164.	22.8	1.	72.1	8.	64.6	.136	3.36	.36	3.	7.16	.68	6.48	.04	1.4
3405	" 29	" 30	v d	vm	.8	1111.2	194.8	916.4	87.2	24.	1.2	34.7	8.3	26.4	.12	1.76	.32	1.44	3.81	.61	3.2	.035	1.05
3427	April 5	Apr. 6	d	l	...	254.4	220.	34.4	30.	25.6	4.1	9.5	....	....	.16	.44	...	....	.85	...	....	.055	1.
3452	" 12	" 13	d	c	.6	241.6	218.8	22.8	25.6	21.2	4.	8.8	....	....	.06	.4	...	....	.85	...	....	.04	1.
3477	" 19	" 21	d	l	...	318.	265.6	52.4	32.	29.2	3.5	7.9	....	....	.044	.36	...	....	.77	...	....	.03	.55
3505	" 26	" 27	d	c	...	356.8	255.6	101.2	34.8	26.4	3.3	9.4	....	....	.022	.36	...	....	.85	...	....	.04	1.1
3533	May 3	May 4	d	m	...	433.2	238.4	194.8	44.8	19.4	3.2	11.2	....	....	.046	.44	...	....	.9	...	....	.035	.85
3558	" 10	" 11	d	c	...	344.	237.2	106.8	37.2	27.6	3.8	7.	....	....	.034	.28	...	....	.58	...	....	.035	1.2
3592	" 17	" 18	v d	vm	...	2662.	178.4	2483.6	150.	34.	1.2	39.	8.6	30.4	.12	1.44	.44	1.	5.94	.86	5.08	.07	1.1
3619	" 24	" 25	v d	m	...	734.4	184.8	549.6	64.	31.2	2.	25.9	....	....	.046	.96	...	....	1.86	...		.05	.9
3639	" 31	June 1	v d	vm	.5	1553.2	190.8	1362.8	74.4	19.2	1.7	48.	6.5	41.5	.014	2.32	.32	2.	5.14	.5	4.64	.07	1.
3662	June 7	" 8	d	c	.05	378.	320.8	57.2	50.8	42.	3.1	6.5	....	....	.014	.22	...	....	.6	...	....	.065	.4
3690	" 14	" 15	d	m	...	929.6	222.8	706.8	57.6	29.2	2.4	9.3	....	....	.017	1.08	...	....	4.44	...	....	.06	.6
3710	" 21	" 22	d	c	.03	778.4	317.2	461.2	454.8	32.8	3.3	5.3	....	....	.015	.24	...	....	.32	...	....	.03	1.3
3755	" 28	" 29	v d	m	...	676.8	.....	......	30.8	....	2.6	18.5	....	....	.006	.64	...	....	1.4	...	....	.04	.75
3787	July 5	July 6	d	l	.05	342.4	302.8	39.6	20.8	20.	3.2	4.5	....	....	.017	.24	...	....	1.16	...	....	.015	.5

†The abnormally high figures occasionally obtained result from the backing of Illinois River water into the Spoon River.

CHEMICAL EXAMINATION OF WATER FROM THE SPOON RIVER AT HAVANA.—CONTINUED.
(Parts per 1,000,000.)

Serial Number.	1898. Date of Collection.	1898. Date of Examination	Appearance. Turbidity.	Appearance. Sediment.	Appearance. Color.	Residue on Evaporation. Total.	Residue on Evaporation. Dissolved.	Residue on Evaporation. Suspended.	Loss on Ignition. Total.	Loss on Ignition. Dissolved.	Chlorine.	Oxygen Consumed. Total.	Oxygen Consumed. By Dissolved.	Oxygen Consumed. By Suspended Matt'r	Nitrogen as Ammonia. Free Ammonia.	Albuminoid Ammonia. Total.	Albuminoid Ammonia. Dissolved.	Albuminoid Ammonia. Suspended	Organic Nitrogen. Total.	Organic Nitrogen. Dissolved.	Organic Nitrogen. Suspended	Nitrogen as Nitrites.	Nitrogen as Nitrates.
3821	July 12	July 13	d	l	.08	298.	244.8	53.2	15.2	12.8	3.2	6.6	..	....	.052	.6	....	....	1.08	....	....	.036	.25
3844	" 19	" 20	d	c	.05	357.2	314.8	42.4	16.8	13.2	5.1	6.5	....	....	.062	.32	....	....	.8	....	....	.017	.2
3885	" 26	" 27	d	c	.	294.4	276.8	17.6	28.	25.2	3.3	5.3	....	....	.082	.36	....	....	.6	....	....	.001	.1
3907	Aug. 2	Aug. 3	d	c	...	326.	280.8	45.2	14.	12.8	3.5	5.8	....	....	.074	.32	....	....	.8		....	.02	.1
3938	" 9	" 10	d	c	...	663.6	174.	489.6	34.	19.2	2.8	15.	....	....	.082	.6	....	....	1.44	....	....	.135	.25
3964	" 16	" 17	d	c	...	263.2	212.8	50.4	24.	22.	3.	7.3	....	....	.17	.28	....	....	.64	....	....	.1	.2
3984	" 23	" 24	d	c	.1	320.4	227.6	92.8	25.2	22.8	2.7	7.6	....	....	.016	.28	..	....	.56	....	....	.003	.15
4013	" 30	" 31	d	c	...	338.	242.	96.	25.6	24.	2.9	7.2	....	....	.014	.32	....	....	.6	....	....	.05	.15
4046	Sep. 6	Sept. 7	vd	vm	...	5846.	168.9	5677.9	158.	20.8	3.2	79.	....	....	.0?6	3.6	....	....	8.32	....	....	.034	.4
4072	" 13	" 14	d	c	...	307.	2?3.2	53.8	25.2	22.	2.9	6.6	....	....	.026	.2	....	....	.48	....	....	.014	.2
4093	" 20	" 21	d	c	.03	329.	236.8	92.2	22.	22.	3.1	6.6	....	....	.014	.24	....	....	.48	....	....	.023	.25
4126	" 27	" 28	d	c	.03	356.4	286.8	69.6	35.2	27.2	3.5	6.	....	....	.016	.2	....	....	.56	....	....	.02	.6
4146	Oct. 4	Oct. 5	d	c	.05	345.2	318.	27.2	29.2	26.	3.5	4.3	....	....	.016	.16	....	....	.36	.	....	.005	.35
4196	" 11	" 12	d	l	.1	327.6	298.4	29.2	32.	27.2	3.2	4.6	....	....	.008	.2	....	....	.33	....	....	.058	.45
4231	" 18	" 19	d	l	.05	326.	312.	14.	32.	31.2	3.5	4.	....	....	.01	.144	....	....	.29	....	....	.004	.25
4259	" 25	" 26	d	l	.1	318	304.8	13.2	28.	24.	4.	3.8	....	....	.016	.144	....	....	.33	....	....	.005	.45
4300	Nov. 1	Nov. 2	d	c	...	320.8	300.	20.8	32.8	30.	4.7	6.3	....	....	.042	.24	....	....	.49	....	....	.017	.3
4333	" 8	" 9	d	l	...	336.8	316.	20.8	30.	28.	3.8	5.2	....	....	.036	.24	....	....	.35		....	.006	.6
4373	" 15	" 17	d	l	...	328.	309.2	18.8	30.	27.2	4.2	5.5	....	....	.02	.208	....	....	.43	....	....	.014	.55
4400	" 22	" 23	d	l	.1	332.	324.	8.	32.	30.	4.5	3.3	....	....	.012	.096	....	....	.33	....	....	.004	.65
4433	" 29	" 30	d	l	.03	335.2	332.	3.2	46.4	42.	3.5	2.8	....	....	.022	.128	....	....	.27	....	....	.007	.8
4460	Dec. 6	Dec. 7	s	l	.02	326.8	326.	.8	40.	36.	3.9	2.2	....	....	.03	.09	....	....	.21	....	....	.001	.3
4484	" 13	" 14	s	c	.02	367.6	360.	6.8	50.8	48.8	4.4	3.	2.7	.3	.02	.078	.074	.004	.29	.21	.08	.004	.25
4511	" 20	" 21	d	c	.08	486.8	338.8	148.	66.	60.	5.2	15.2	....	....	.008	.56	....	....	1.25	....	....	.03	.5
4541	" 27	" 28	d	c	...	330.8	240.8	90.	48.	40.	5.8	27.1	....	....	.28	.88	....	....	1.81	....	....	.02	.25
Average Jan. 4–June 28.						704.9	224.8	408.	67.7	24.2	3.2	20.	9.5	26.8	.19	.794	.384	1.12	2.02	.69	2.68	.056	1.01
Average July 5–Dec. 27.						558.5	281.1	277.4	32.3	27.4	3.7	9.6	2.7	.3	.047	.413	.074	.004	.93	.21	.08	.023	.34
Average Jan. 4–Dec. 27.						631.7	253.	378.7	51.9	25.8	3 4	14.8	8.9	24.4	.119	.603	.355	1.018	1.47	.65	2.46	.039	.67

† The abnormally high figures occasionally obtained result from the backing of Illinois river into the Spoon river.
The water in all cases was odorless. The color upon ignition was brown.

CHEMICAL EXAMINATION OF WATER FROM LAKE MICHIGAN AT CHICAGO.
(Parts Per 1,000,000.)

Serial Number.	1897 Date of Collection.	1897 Date of Examination.	Appearance. Turbidity.	Appearance. Sediment.	Appearance. Color.	Residue on Evaporation. Total.	Residue on Evaporation. Dissolved.	Residue on Evaporation. Suspended.	Residue on Evaporation. Loss on Ignition. Total.	Residue on Evaporation. Loss on Ignition. Dissolved.	Chlorine.	Oxygen Consumed. Total.	Oxygen Consumed. By Dissolved.	Oxygen Consumed. By Suspended Matt'r	Nitrogen as Ammonia. Free Ammonia.	Nitrogen as Ammonia. Albuminoid Ammonia. Total.	Nitrogen as Ammonia. Albuminoid Ammonia. Dissolved.	Nitrogen as Ammonia. Albuminoid Ammonia. Suspended	Organic Nitrogen. Total.	Organic Nitrogen. Dissolved.	Organic Nitrogen. Suspended	Nitrogen as Nitrites.	Nitrogen as Nitrates.
1794	Jan. 4	Jan. 4	s	l	.02.03*	137.2	136.4	.8	5.2	5.2	3.1	3.2	3.	.2	.004	.08	.064	.016	.32	.24	.08	.002	.15
1812	11	11	s	l	.03.04*	141.6	140.	1.6	9.6	4.	3.4	2.5	2.2	.3	.016	.08	.048	.032	.32	.24	.08	none	.2
1832	18	18	s	l	.04.05*	148.	142.4	5.6	9.2	8.4	3.5	3.8	3.2	.6	.024	.136	.08	.056	.4	.28	.12	.002	.3
1844	25	25	s	l	.01.02*	140.8	140.	.8	6.	5.2	3.	3.	2.7	.3	.004	.096	.08	.016	.4	.208	.192	none	.13
1864	Feb. 1	Feb. 1	s	l	.04	142.4	141.2	1.2	6.	4.	3.2	2.4	1.8	.6	.004	.096	.08	.016	.4	.32	.08		.15
1893	8	8	s	l	.01.02*	141.6	140.8	.8	7.2	6.	3.	2.	1.8	.2	.008	.08	.0784	.0016	.304	.272	.032		.2
1912	15	15	s	l	.03.04*	140.4	136.8	3.6	4.4	2.	3.	1.9	1.7	.2	.008	.112	.096	.016	.256	.224	.032		.2
1931	22	22	s	l	.02.03*	146.8	141.2	5.6	14.	10.	3.2	2.1	1.6	.5	.004	.098	.066	.032	.24	.184	.056		.25
1953	Mar. 1	Mar. 1	s	l	.01.02*	150.8	144.4	6.4	12.8	10.4	3.	2.1	1.8	.3	.004	.082	.07	.012	.36	.24	.12		.25
1972	8	8	s	vl	.03.05*	158.8	157.2	1.6	34.	27.6	3.	2.6	2.5	.1	.004	.096	.076	.02	.25	.23	.02		.18
2000	15	15	s	vl	.02.03*	136.4	136.	.4	15.2	15.2	2.9	2.2	2.	.2	.002	.096	.08	.016	.23	lost	....		.2
2028	22	22	s	vl	.02.03*	148.	143.6	4.4	18.	15.2	3.1	3.	2.6	.4	.003	.112	.068	.044	.174	.15	.024	.001	.27
2052	29	29	s	vl	.03.04*	160.	152.	8.	18.8	18.	3.2	3.1	2.8	.3	.008	.086	.064	.022	.24	.2	.04	.002	.27
2089	Apr. 5	Apr. 6	s	l	.03.1*	176.4	163.2	13.2	22.	19.6	3.9	4.9	4.2	.7	.062	.144	.102	.042	.43	.27	.16	.006	.5
2108	12	12	s	vl	.03.04*	142.	137.2	4.8	12.8	9.6	2.8	3.	2.3	.7	.001	.076	.068	.008	.21	.15	.06	none	.15
2137	20	21	s	l	.02.05*	179.2	155.6	23.6	20.	19.2	3.	4.5	3.6	.9	.014	.172	.114	.058	.35	.2	.15	.001	.15
2154	26	27	s	l	.02.04*	152.8	145.2	7.6	12.8	10.	3.	4.3	2.7	1.6	.007	.124	.078	.046	.23	.2	.03	.04	.3
2186	May 4	May 5	d	c	.0?	468.	140.	328.	22	14.	2.8	14.7	3.2	11.5	.006	.416	.092	.324	.95	.182	.768	.008	.4
2203	10	11	s	l	.02.03*	141.6	132.8	8.8	9.2	6.8	2.8	4.3	4.	.3	.001	.094	.074	.02	.23	.094	.136	none	.15
2221	17	18	s	vl	.03.04*	149.2	145.2	4.	13.2	12.	3.	4.7	4.5	.2	.002	.096	.064	.032	.23	.174	.056	.002	.2
2255	24	25	vs	vl	.03.04*	142.	141.6	.4	13.2	12.8	2.8	2.5	2.3	.2	.001	.072	.058	.014	.23	.19	.04	none	.25
2276	31	31	s	vl	.01.03*	142.8	137.6	5.2	6.8	6.4	2.7	1.7	1.5	.2	.002	.1	.072	.028	.27	.21	.06		.1
2309	June 9	Jun. 10	s	l	.02.0*	140.8	138.	2.8	9.6	6.	3.1	2.5	2.3	.2	.004	.096	.086	.01	.29	.21	.08		.21
2323	14	15	s	l	.01.02*	144.	141.6	2.4	12.0	11.6	2.7	3.3	3.	.3	.002	.096	.078	.018	.21	.17	.04		.2
2359	21	22	vs	vl	.02.03*	150.	136.	14.	12.8	6.8	2.1	2.4	2.	.4	.004	.076	.062	.014	.25	.17	.08		.2
2383	28	29	vs	vl	.03	145.6	144.4	1.2	17.6	15.2	3.	4.	3.	1.	.004	.09	.078	.012	.29	.19	.1		.1
2414	July 6	July 7	vs	vl	.....	138.	136.8	1.2	12.	8.	2.9	3.3	3.1	.2	none	.07	.062	.008	.56	.52	.04		.1
2433	12	13	vs	vl	.02.03*	132.2	121.2	3.	7.2	6.	2.9	1.6	1.5	.1	.001	.08	.072	.008	.16	.1	.06		.06

CHEMICAL EXAMINATION OF WATER FROM LAKE MICHIGAN AT CHICAGO —CONTINUED.
(Parts Per 1,000,000.)

Serial Number.	1897 Date of Collection.	1897 Date of Examination.	Appearance. Turbidity.	Appearance. Sediment.	Appearance. Color.	Residue on Evaporation. Total.	Residue on Evaporation. Dissolved.	Residue on Evaporation. Suspended.	Residue on Evaporation. Loss on Ignition. Total.	Residue on Evaporation. Loss on Ignition. Dissolved.	Chlorine.	Oxygen Consumed. Total.	Oxygen Consumed. By Dissolved.	Oxygen Consumed. By Suspended Matt'r	Nitrogen as Ammonia. Free Ammonia.	Nitrogen as Ammonia. Albuminoid Ammonia. Total.	Nitrogen as Ammonia. Albuminoid Ammonia. Dissolved.	Nitrogen as Ammonia. Albuminoid Ammonia. Suspended	Organic Nitrogen. Total.	Organic Nitrogen. Dissolved.	Organic Nitrogen. Suspended	Nitrogen as Nitrites.	Nitrogen as Nitrates.
2462	July 19	July 20	s	1	.0 .05*	158.	139.2	18.8	16.	12.	2.9	2.4	2.	.4	.002	.102	.078	.024	.28	.24	.04	none	.15
2485	" 26	" 27	s	1	.03	150.8	134.8	16.	11.2	6.	3.	3.8	3.2	.6	.001	.102	.076	.026	.24	.2	.04	"	.1
2518	Aug. 2	Aug. 3	s	1	.01.03*	190	138.4	51.6	14.	11.2	2.8	5.	3.9	1.1	.001	.142	.104	.038	.16	.12	.04	"	.1
2538	" 9	" 10	vs	vl	.02.03*	134.4	127.2	7.2	11.2	10.4	3.	3.2	2.8	.4	.001	.09	.086	.004	.24	.18	.06	"	.1
2563	" 16	" 17	s	1	.02.03*	135.2	127.2	8.	11.6	10.8	2.9	3.8	3.4	.4	.001	.102	.09	.012	.24	.22	.02	"	.35
2584	" 23	" 24	s	1	.02.03*	135.2	134.	1 2	11.2	9.2	2.9	3.1	2.8	.3	.001	.106	.088	.018	.28	.24	.04	"	.1
2610	" 30	" 31	s	1	.02.03*	128.	17.2	.8	10.	8.	2.9	3.8	3.6	.2	.001	.094	.082	.012	.22	.2	.02	"	.05
2647	Sept. 7	Sep. 8	vs	1	.02	128.4	123.2	5.2	11.6	10.4	3.	3.2	3.	.2	.002	.086	.08	.006	.156	.148	.008	"	.15
2661	" 13	" 14	s	1	.02.03*	136.	134.	2.	10.	9.6	3.	2.9	2.7	.2	.002	.08	.074	.006	.164	.148	.016	"	.15
2700	" 21	" 22	s	1	.02.03*	134.8	134.4	.4	8.	7.2	3.1	3.2	2.8	.4	.001	.07	.064	.006	.18	.16	.02	"	.1
2716	" 27	" 28	s	1	.03.04*	139.2	138.	1.2	6.	5.6	3.	3.	2.8	.2	.002	.106	.092	.014	.188	.172	.016	"	.1
2750	Oct. 4	Oct. 5	s	1	.03.03*	136.4	129.2	7.2	14.8	14.4	2.9	3.5	3.3	.2	.001	.074	.06	.014	.22	.188	.032	"	.1
2797	" 13	" 14	vs	vl	.02.02*	138.	133.6	4.4	13.2	7.6	2.7	2.65	2.65	...	.006	.07	.98	....	.172	.252	....	"	.15
2813	" 18	" 19	d	1	.02.03*	146.	140.	6.	10.	9.2	3.1	3.5	3.3	.2	.004	.106	.076	.03	.284	.19	.094	.002	.05
2870	Nov. 1	Nov. 2	vs	vl	.02.02*	135.6	131.2	4.4	12.4	10.8	2.7	3.1	2.9	.2	.01	.078	.068	.01	.204	.188	.016	none	.3
2922	" 9	" 10	d	1	.03.06*	149.2	138.	11.2	12.	6.4	3.	3.6	3.	.6	.001	.12	.084	.036	.204	.172	.032	.001	.35
2954	" 15	" 16	s	1	.03.04*	136.8	132.8	4.	7.6	6.	2.9	3.	2.5	.5	.001	.08	.076	.004	.18	lost	....	none	.35
2972	" 22	" 23	s	1	.02.08*	144.	136.	8.	6.	5.2	2.8	2.7	2.6	.1	.001	.098	.09	.008	.188	.172	.016	.001	.2
3002	" 29	" 30	s	1	.02.03*	141.2	132.	9.2	12.4	12.	2.7	2.9	2.7	.2	.001	.74	.064	.01	.178	.162	.016	none	.4
3021	Dec. 6	Dec. 7	d	1	.03.08*	164.4	140.	24.4	6.	4.	2.8	3.8	2.9	.9	.018	.172	.07	.102	.25	.21	.04	.004	.4
3063	" 13	" 14	d	1	.03.06*	148.4	142.8	5.6	12.4	8.	3.1	3.2	2.6	.6	.03	.112	.084	.028	.242	.226	.016	.004	.45
3085	" 21	" 23	s	1	.02.04*	143.2	132.	11.2	8.4	4.	2.9	3.	2.8	.2	.001	.062	.056	.006	.194	.178	.016	none	.25
3094	" 27	" 28	s	1	.02.04*	146.8	146.4	.4	10.	9.2	2.8	2.6	2.4	.2	.001	.068	.054	.014	.21	.162	.048	"	.12
Average Jan. 4–.Dec 27............						151.7	136.6	15.	11.9	9.6	2.9	3.3	2.7		.005	.102	.076	.036	.268	.195	.73	.005	.2

*Not filtered.

CHEMICAL EXAMINATION OF WATER FROM LAKE MICHIGAN AT CHICAGO.
(Parts per 1,000,000.)

Serial Number.	1898 Date of		Appearance.			Residue on Evaporation.					Chlorine.	Oxygen Consumed.			Nitrogen as Ammonia				Organic Nitrogen.			Nitrogen as	
									Loss on Ignition.							Albuminoid Ammonia.							
	Collection.	Examination.	Turbidity.	Sediment.	Color.	Total.	Dissolved.	Suspended.	Total.	Dissolved.		Total.	By Dissolved.	By Suspended Matt'r	Free Ammonia.	Total.	Dissolved.	Suspended	Total.	Dissolved.	Suspended	Nitrites.	Nitrates.
3120	Jan. 3	Jan. 4	s	l	.02.03*	138.8	130.4	8.4	11.6	10.	2.8	2.1	2.	.1	.001	.07	.064	.006	194	.162	.032	none	.15
3136	" 10	" 11	vs	vl	.01.02*	144.4	138.8	5.6	13.6	12.8	2.9	2.5	2.3	.2	.001	.114	.084	.03	.220	.152	.068	"	.16
3174	" 18	" 19	s	l	.02.03*	154.	140.	14.	10.4	10.	3.	3.	2.6	.4	.001	.098	.094	.004	.184	.168	.016	.001	.3
3204	" 24	" 25	d	l	.04.07*	171.6	14?.2	?0.4	7.2	6.	3.1	3.	2.	1.	.002	.11	.09	.02	.216	.15	.066	.001	.3
3225	" 31	Feb. 1	d	l	.4	213.2	146.8	66.4	18.8	14.8	3.	3.6	2.7	.9	.008	.116	.068	.048	.28	.184	.096	none	.3
3241	Feb. 7	" 8	d	l	.04.1*	176.	166.4	9.6	31.2	21.2	3.1	3.	2.7	.3	.01	.102	.09	.012	.18	.16	.02	.001	.1
3263	" 14	" 15	s	l	.02.03*	152.	146.8	5.2	13.2	12.	3.3	3.5	3.	.5	.06	.08	.076	.004	.232	.2	.032	.005	.19
3291	" 21	" 22	d	l	.04.15*	195.6	152.8	42.8	19.2	16.8	3.	3.6	3.	.6	.006	.094	.088	.006	.232	.184	.048	.001	.2
3311	" 28	Mar. 1	d	l	.1.15*	159.2	140.8	18.4	13.2	8.8	3.	3.1	2.9	.2	.002	.096	.088	.008	.184	.152	.032	none	.5
3332	Mar. 7	" 8	s	l	.03.04*	147.6	139.2	8.4	9.6	8.4	2.9	2.6	2.	.6	.004	.072	.066	.006	.184	.168	.016	"	.4
3352	" 14	" 15	d	l	.05.06*	184.	167.2	16.8	25.6	22.8	5.8	4.5	4.	.5	.3 8	.196	.150	.046	.6	.424	.176	.02	.55
3382	" 21	" 22	d	l	.10.20*	181.6	172.4	9.2	24.	21.2	5.4	4.9	4.3	.6	.286	.212	.186	.026	.408	.376	.032	.025	.65
3399	" 28	" 29	d	l	.15*	182.	164.8	17.2	16.	15.6	3.4	3 8	3.4	.4	.03	.116	.088	.028	.322	.2?2	.08	.005	.2
3420	Apr. 4	Apr. 5	d	l	.03.3*	204.4	180.8	23.6	22.4	19.6	6.	5.8	4.9	.9	.22	.21	.18	.03	.482	.29	.192	.04	.5
3443	" 11	" 12	s	l	.03.04*	144.8	137.6	7.2	10.4	10.	3.2	2.6	2.5	.1	.004	.102	.08	.022	lost	.21	....	.001	.5
3466	" 18	" 19	s	l	.0?.06*	169.2	151.6	17.6	10.4	9.2	3.	3.	2.8	.2	.006	.122	.118	.004	.274	.21	.06	.003	.9
3500	" 25	" 26	s	l	.02.03*	149.2	146.4	2.8	11.2	10.	3.2	4.	3.3	.7	.001	.092	.088	.004	.194	.162	.0 2	none	.35
3535	May 3	May 4	vs	vl	.02.04*	152.4	138.	14.4	20.	10.8	3.2	2.9	2.5	.4	.004	.088	.082	.006	.22	.18	. 4	"	.4
3547	" 9	" 10	vs	vl	.02.03*	143.6	142.8	.8	14.	12.8	3.1	2.7	2.5	.2	.002	.102	.074	.0 8	.232	21.	.022	.001	.2
3595	" 18	" 19	vs	vl	.02.03*	152.4	146.4	6.	20.	18.	3.	3.	2.8	.2	.006	.094	.086	.008	.14	.116	.024	.0 1	.4
3603	" 23	" 24	s	l	.01.02*	149.6	147.2	2.4	19.2	18.	3.	2.8	2.6	.2	.002	.08	.074	.006	.228	.196	.132	.001	.3
3637	" 31	June 1	s	l	.02.03*	142.	37.2	4.8	12.	8.4	3.	2.7	2.5	.2	.001	.076	.072	.004	.124	.116	.0 8	none	.25
3654	June 6	" 7	s	l	.01.02*	142.4	136.	6.4	.6.8	16.	3.	3.2	3.	.2	.001	.084	.074	.01	.232	.?84	.048	"	.15
3679	" 13	" 14	s	none	03	120.	1 6.	14.	10.8	8.4	4.	2.7	2.5	.2	.001	.084	.072	.012	.24	.2	.04	"	.15
3701	" 20	" 21	s	none	.02	126.4	108.8	17.6	11.2	6.8	.1	1.9	1 9	...	.001	.066	.064	.002	.144	.144	...	"	.20
3751	" 27	" 28	s	l	.02.03*	166.4	132.4	34.	12.	10.	3.5	3.5	3.3	.2	.008	.086	.080	.006	.16	.14	.02	. 01	.1
3790	July 5	July 6	s	l	.02	136.	130.4	5.6	14.	1.	3.1	2.8	2.7	.1	none	.072	.066	.006	.22	.152	.068	none	.2

CHEMICAL EXAMINATION OF WATER FROM LAKE MICHIGAN AT CHICAGO.—CONTINUED.
(Parts per 1,000,000.)

Serial Number.	1898 Date of Collection.	1898 Date of Examination.	Appearance. Turbidity.	Appearance. Sediment.	Appearance. Color.	Residue on Evaporation. Total.	Residue on Evaporation. Dissolved.	Residue on Evaporation. Suspended.	Residue on Evaporation. Loss on Ignition. Total.	Residue on Evaporation. Loss on Ignition. Dissolved.	Chlorine.	Oxygen Consumed. Total.	Oxygen Consumed. By Dissolved.	Oxygen Consumed. By Suspended Matt'r.	Nitrogen as Ammonia. Free Ammonia.	Nitrogen as Ammonia. Albuminoid Ammonia. Total.	Nitrogen as Ammonia. Albuminoid Ammonia. Dissolved.	Nitrogen as Ammonia. Albuminoid Ammonia. Suspended	Organic Nitrogen. Total.	Organic Nitrogen. Dissolved.	Organic Nitrogen. Suspended	Nitrogen as Nitrites.	Nitrogen as Nitrates.
3833	July 18	July 19	s	1	.01.02*	138.8	137.2	1.6	10.8	10.	3.1	2.	1.9	.1	.001	.06	.058	.004	.016	.128	.032	none	.075
3871	" 25	" 26	s	1	.02.02*	41.2	136.	5.2	14.	12.8	3.1	1.9	2.8	.1	.001	.072	.068	.004	.128	.112	.906	"	.2
3908	Aug. 2	Aug.3	s	1	.01.02*	134.4	125.6	8.8	11.2	8.	3.	2.8	2.6	.2	.0?2	.068	.054	.014	.112	.096	.016	"	.2
3927	" 8	" 9	s	1	.02.02*	131.2	128.	3.2	12.	11.2	3.	2.7	2.3	.4	.001	.064	.06	.004	.16	.128	.032	"	.05
3952	" 15	" 16	s	1	.02.03*	143.2	139.6	3.6	21.2	20.	3.3	2.7	2.5	.2	.004	.076	.07	.006	.176	.16	.016		.15
3976	" 22	" 23	s	1	.01.02*	13?.2	129.2	4.	14.	12.	3.1	2.9	2.7	.2	.005	.064	.062	.002	.112	.096	.016	.001	.2
4005	" 29	" 30	s	1	.01.01*	136.4	135.2	1.2	15.2	14.	3.1	2.5	2.2	.3	.002	.092	.078	.014	.144	.112	.032	none	.04
4039	Sept. 5	Sept. 6	s	1	.02.03*	136.8	134.4	2.4	14.	13.2	3.	3.	2.8	.2	.002	.06	.058	.902	.144	.128	.916	"	.05
4063	" 12	" 13	s	1	.02.03*	142.8	138.	4.8	23.2	18.8	2.9	2.5	2.4	.1	.002	.066	.062	.004	.112	.096	.016	"	.05
4085	" 19	" 20	s	1	.02.93*	136.	138.8	3.2	13.2	12.	3.	2.4	2.2	.2	.004	.064	.060	.004	.096	.08	.016	"	.1
4117	" 26	" 27	s	1	.01.02*	139.2	134.8	4.4	16.	14.	3.1	1.8	1.7	.1	.001	.07	.066	.004	.16	.124	.036	"	.04
4159	Oct. 3	Oct. 4	s	1	.02.03*	139.2	132.	7.2	13.6	12.	2.9	2.5	2.3	.2	.002	.064	.058	.006	.16	.128	.032	"	.1
4191	" 1	" 11	s	1	.01.02*	132.	130.4	1.6	24.	13.2	2.9	2.1	1.8	.3	.004	.074	.06	.014	.13	.1	.93		.3
4223	" 17	" 18	d	1	.02.05*	153.6	136.4	17.2	12.	11.2	3.	2.6	2.	.6	.006	.088	.07	.018	.194	.146	.048	.001	.2
4244	" 24	" 25	s	1	.02.03*	142.8	134.8	8.	16.8	14.8	3.	2.3	2.	.3	.002	.098	.086	.012	.162	.13	.032	none	.2
4292	" 31	Nov. 1	d	1	.05	190.	142.	48.	18.	16.	3.1	3.4	2.4	1.	.022	.094	.072	.022	.258	.146	.112	.003	.4
4325	Nov. 7	" 8	d	1	.02	158.	138.	20.	12.	10.	3.	2.7	2.	.7	.01	.076	.07	.006	.162	.13	.032	.002	.1
4360	" 14	" 15	d	§	.03	184.4	136.	48.4	18.4	12.	3.3	3.2	2.2	1.	.046	.064	.058	.006	.22	.126	.094	.005	.15
4392	" 21	" 22	d	1	.02	164.8	134.8	30.	16.8	14.8	3.1	2.6	2.3	.3	.008	.082	.0?2	.02	.19	.126	.064	.002	.08
4422	" 28	" 29	d	1	.02	187.2	140.8	46.4	24.	20.8	3.9 3.8	3.6	2.2	1.4	.072	.11	.09	.02	.302	.19	.112	.013	.5
4456	Dec. 5	Dec. 6	d	1	.04	174.	124.8	49.2	22.	16.8	3.1	2.7	2.	.7	.004	.106	.084	.022	.194	.162	.032	.01	.15
4476	" 12	" 13	s	1	.02.04*	136.	129.6	6.4	20.	16.8	3.1	2.6	2.4	.2	none	.06	.05	.01	.18	.13	.05	none	.1
4513	" 20	" 21	s	1	.03.05*	142.	135.6	6.4	28.	22.8	3.2	2.3	2.	.3	.004	.086	.07	.016	.18	.18	.05	"	.1
4531	" 27	" 28	s	1	.03.04*	142.	134.8	7.2	20.	18.	3.	2.2	1.8	.4	none	.064	.052	.0?2	.146	.11	.036	none	.1
Average Jan. 3—Dec. 27						154.2	137.6	16.6	15.9	13.6	3.2	2.9	2.5	.4	.024	.191	.078	.012	.202	.161	.041	.008	.239

Not filtered. § Considerable.

CHEMICAL EXAMINATION OF WATER FROM LAKE MICHIGAN AT CHICAGO.
(Parts per 1,000,000.)

Serial Number.	1899 Date of Collection.	Examination.	Appearance. Turbidity.	Sediment.	Color.	Residue on Evaporation. Total.	Dissolved.	Suspended.	Loss on Ignition. Total.	Dis-solved.	Chlorine.	Oxygen Consumed. Total.	By Dis-solved.	By Suspended Matt'r	Nitrogen as Ammonia Free Ammonia.	Albuminoid Ammonia. Total.	Dis-solved.	Sus-pended	Organic Nitrogen. Total.	Dissolved.	Suspended	Nitrogen as Nitrites.	Nitrates.
4567	Jan. 3	Jan. 4	s	1	.02.03*	144.	136.	8.	22.	17.2	3.2	2.4	1.8	.6	.002	.06	.056	.004	.13	.1	.03	.001	.15
4590	" 9	" 10	s	1	.03.04*	153.2	147.6	5.6	16.	14.8	3.3	2.7	2.5	.2	.012	.06	.054	.006	.194	.13	.064	none	.15
4614	" 16	" 17	s	1	.01.02*	133.2	129.2	4.	23.2	20.	3.2	2.2	2.1	.1	.01	.058	.052	.006	.13	.114	.016	"	.1
4639	" 23	" 24	s	1	.01.02*	136.8	129.6	7.2	20.	18.8	3.1	1.7	1.6	.1	.004	.064	.06	.004	.13	.114	.016	"	.1
4676	Feb. 6	Feb. 7	s	1	.01.02*	136.8	132.	4.8	18.	16.	3.2	2.3	2.	.3	.002	.072	.058	.014	.16	.13	.03	"	.42
4697	" 13	" 14	s	1	.01.02*	152.8	144.	8.8	22.	20.	3.3	2.4	2.2	.2	.001	.07	.06	.01	.132	.1	.032	"	.1
4727	" 20	" 21	s	1	.01.02*	140.8	138.	2.8	18.	16.	3.1	2.3	2.1	.2	.002	.01	.056	.014	.132	.1	.032	"	.15
4748	" 27	" 28	s	1	.02.03*	148.	142.	6.	24.	22.	3.2	2.5	2.1	.4	.01	.104	.094	.01	.13	.1	.03	"	.1
4778	Mar. 6	Mar. 7	s	1	.01.03*	160.	139.2	20.8	24.	19.2	3.2	2.4	2.1	.3	.001	.074	.07	.004	.164	.148	.016	"	.15
4798	" 13	" 14	s	1	.01.03*	144.	136.	8.	24.	22.	3.1	2.8	2.2	.6	.008	.096	.076	.02	.148	.116	.032	"	.075
4834	" 20	" 21	d	1	.02.03*	162.8	134.	28.8	22.	18.	3.1	2.6	2.1	.5	.001	.074	.056	.018	.196	.148	.048	"	.15
4857	" 27	" 28	s	1	.02.03*	142.	134.8	7.2	18.	16.	3.	2.	1.8	.2	none	.05	.046	.004	.126	.11	.016	"	.06
4889	Apr. 3	Apr. 4	s	1	.01.02*	134.	132.	2.	18.	16.8	3.	2.1	2.	.1	.001	.058	.054	.004	.126	.11	.016	"	.1
4910	" 10	" 11	s	1	.01.02*	136.	132.	4.	18.	16.	3.	2.1	2.	.1	none	.058	.056	.002	.11	.094	.016	"	.12
4933	" 17	" 18	s	1	.02*	140.	136.	4.	20.	18.	3.1	2.4	2.3	.1	.002	.086	.068	.018	.158	.11	.048	"	.1
4955	" 24	" 25	s	1	.01.02*	139.2	136.4	3.2	18.	17.2	3.	2.3	2.1	.2	.002	.07	.066	.004	.138	.122	.016	"	.12
4981	May 1	May 2	s	1	.01.02*	141.2	140.4	.8	16.	15.2	3.1	2.3	2.05	.25	.001	.076	.062	.014	.13	.106	.024	"	.1
5?07	" 8	" 9	s	1	02.03*	138.2	137.2	.8	20.	19.2	3.1	2.1	2.1	.00	.001	.062	.058	.004	.154	....	....	"	.22
5043	" 16	" 17	s	1	.01.03*	143.6	137.2	6.4	8.	7.2	3.	2.9	2.9	.00	.001	.098	.082	.016	.218	.17	.048	"	.23
50 4	" 22	" 23	s	1	.01.02*	154.4	143.6	10.8	17.2	11.2	3.15	2.4	2.4	.00	.001	.076	.064	.012	.22	.2	.02	"	.38
5110	" 29	" 30	s	1	.01.02*	159.6	158.	1.6	27.6	27.6	2.8	2.	1.95	.05	.001	.084	.072	.012	.234	.186	.048	"	.17
5154	June 5	Jun. 6	s	1	.01.03*	141.6	140.	1.6	16.8	15.8	2.9	2.	2.	.00	.001	.086	.082	.004	.154	.122	.032	"	.2
5211	" 13	" 14	s	1	.01.02*	146.8	134.	12.8	19.2	10.4	2.15	1.95	1.75	.2	.001	.074	.056	.018	.328	.248	.08	"	.2
5243	" 19	" 20	s	1	.01.02*	160.	156.8	3.2	26.8	24.8	2.85	2.35	2.2	.15	.001	.072	.062	.01	.232	.152	.08	"	.12
52?3	" 26	" 27	s	1	.01.02*	137.2	128.8	8.4	8.	7.2	3.3	1.85	1.8	.05	.001	.06	.058	.002	.2	.176	.024	"	.08
5336	July 3	July 4	s	1	.01.02*	154.	138.4	15.6	44.	14.8	2.9	2.8	2.5	.3	.001	.082	.08	.002	.224	.2	.024	"	.2
5?81	" 10	" 11	s	1	.01.02*	1 6.	131.6	4.4	22.	20.8	3.3	1.6	....	....	.001	.068	.064	.004	.224	.176	.048	"	.2
5438	" 18	" 19	s	1	.02.03*	134.	134.	....	22.4	18.8	3.4	3.1	....	....	.001	.076	.07	.006	.216	.144	.072	"	.16

CHEMICAL EXAMINATION OF WATER FROM LAKE MICHIGAN AT CHICAGO.—CONTINUED.
(Parts per 1,000,000.)

Serial Number.	1899 Date of		Appearance.			Residue on Evaporation.					Chlorine.	Oxygen Consumed.			Nitrogen as Ammonia				Organic Nitrogen.			Nitrogen as	
	Collec-tion.	Exami-nation.	Turbidity.	Sediment.	Color.	Total.	Dissolved.	Suspended.	Loss on Ignition. Total.	Loss on Ignition. Dis-solved.		Total.	By Dis-solved.	By Suspen ded Matt'r	Free Ammonia.	Albuminoid Ammonia. Total.	Albuminoid Ammonia. Dis-solved.	Albuminoid Ammonia. Sus-pended	Total.	Dissolved.	Suspended	Nitrites.	Nitrates.
5476	July 24	July 25	s	1	.02.03*	146.8	137.6	9.2	34.4	32.8	3.3	5.	4.5	.5	.001	.092	.072	.02	.192	.16	.032	none	.28
5528	“ 31	Aug. 1	d	1	.01.03*	178.8	138.	40.8	70.8	31.2	3.7	6.4	5.7	.7	.007	.108	.1	.008	.256	.184	.072	“	.16
5574	Aug. 7	“ 8	s	1	.01.02*	125.6	124.8	.8	27.6	25.6	3.	2.5	2.2	.3	.001	.072	.062	.01	.184	.168	.016	“	.16
5625	“ 14	“ 15	d	1	.01.02*	124.8	111.6	13.2	27.2	22.8	2.85	3.4	2.8	.6	.001	.072	.056	.016	.184	.12	.064	“	.12
5671	“ 21	“ 22	s	1	.01.03*	123.6	99.6	24.	20.	6.	3.	3.3	2.9	.4	.001	.074	.06	.014	.2	.112	.088	“	.24
5795	Sep. 5	Sep. 6	s	1	.01.03*	136.4	126.4	10.	20.4	19.2	2.85	3.6	2.	1.6	none	.08	.074	.006	.2	.184	.016	“	.2
5831	“ 11	“ 12	s	1	.01.03*	128.4	123.6	4.8	13.2	10.8	2.9	2.	1.8	.2	.001	.088	.072	.016	.244	.184	.06	“	.24
5877	“ 18	“ 19	s	1	.01.03*	127.2	124.4	2.8	15.2	13.6	3.1	1.9	1.7	.2	.001	.11	.072	.038	.232	.2	.032	“	.16
5929	“ 25	“ 26	s	1	.01.02*	123.2	124.8	....	4.	5.6	3.1	2.2	2.2	...	.001	.074	.064	.01	.164	.14	.024	“	.12
5993	Oct. 3	Oct. 4	s	1	.01.02*	125.2	124.4	.8	22.	22.	7.	2.9	2.9		.001	.068	.068	....	.172	.164	.008	“	.08
6041	“ 10	“ 11	s	1	.01.02*	130.8	125.2	5.6	9.2	8.8	2.8	2.5	2.3	.2	.001	.086	.072	.014	.132	.104	.028	“	.16
6073	“ 16	“ 17	s	1	.01.02*	123.2	120.8	2.4	9.6	6.4	2.9	2.5	2.5	...	.001	.068	.062	.004	.18	.164	.016	“	.12
6141	“ 23	“ 24	s	1	.01.02*	134.	130.8	3.2	9.6	6.	3.	2.5	2.2	.3	.001	.084	.078	.006	.168	.152	.016	“	.16
6191	“ 30	“ 31	s	1	.01.03*	133.6	118.8	14.8	12.4	11.2	6.	2.2	2.1	.1	.001	lost	.086	....	.212	.2	.012	“	.16
6238	Nov. 6	Nov. 7	s	1	.01.03*	138.8	136.4	2.4	10.	9.6	2.9	1.9	1.8	.1	.001	.076	.066	.01	.204	.18	.024	“	.24
6272	“ 13	“ 14	s	1	.02.04*	155.2	144.8	10.4	22.	12.	lost	2.6	2.2	.4	.002	.1	.078	.022	.228	.148	.08	“	.12
6330	“ 20	“ 21	s	1	.01.03*	136.8	132.8	.4	10.4	6.4	3.3	2.5	2.5		.002	.102	.086	.016	.228	.204	.024	“	.8
6394	“ 27	“ 28	s	1	.01.03*	135.2	126.4	8.8	9.6	8.8	3.2	1.9	...	...	.002	.086	.062	.024	.236	.18	.056	“	.12
6444	Dec. 4	Dec. 5	s	1	.01.04*	134.	125.2	8.8	21.2	14.	3.	2.3	1.7	.6	.001	.082	.072	.01	.228	.204	.024	“	.16
6494	“ 11	“ 12	s	1	.02.03*	137.2	133.6	3.6	26.4	23.2	3.	2.4	2.2	.2	.003	.086	.08	.006	.236	.156	.08	“	.12
6539	“ 18	“ 19	s	1	.01.02*	126.4	122.8	3.6	16.	15.6	2.9	4.	3.6	.4	.001	.08	.07	.01	.26	.18	.08	“	.32
6581	“ 26	“ 27	s	1	.01.02*	124.4	114.	10.4	9.2	8.	3.2	3.9	3.2	.7	.001	.076	.06	.016	.244	.22	.024	“	.28
Average Jan. 3—Dec. 26..............						140.	132.	7.4	18.6	16.	3.1	2.5	2 1	.38	.002	.074	.067	.007	.188	.148	.039	.001	.178

*Not filtered.

CHEMICAL EXAMINATION OF WATER FROM LAKE MICHIGAN AT CHICAGO.
(Parts Per 1,000,000.)

Serial Number.	1900 Date of		Appearance.			Residue on Evaporation.					Chlorine.	Oxygen Consumed.			Nitrogen as Ammonia				Organic Nitrogen.			Nitrogen as	
									Loss on Ignition.							Albuminoid Ammonia.							
	Collec- tion.	Exami- nation.	Turbidity.	Sediment.	Color.	Total.	Dissolved.	Suspended.	Total.	Dis- solved.		Total.	By Dis- solved.	By Suspen ded Matt'r	Free Ammonia.	Total.	Dis- solved.	Sus- pended	Total.	Dissolved.	Suspended	Nitrites.	Nitrates.
6610	Jan. 3	Jan. 4	s	1	.01.03*	142.8	129.6	13.2	21.2	20.1	3.4	3.8	3.6	.2	.002	.084	.072	.012	.22	.156	.064	none	.16
6641	" 8	" 9	d	1	.01.02*	132.	121.6	10.4	20.	14.4	3.	2.9	2.1	.8	.001	.072	.062	.01	.236	.148	.088	"	.2
6687	" 15	" 16	s	1	.01.02*	140.8	130.8	10.	16.	14.4	5.1	2.1	1.9	.2	.004	.082	.07	.012	.184	.12	.064	"	.28
6744	" 23	" 24	s	1	.01.02*	137.2	126.	11.2	13.6	8.8	3.1	2.8	2.4	.4	.004	.074	.07	.004	.2	.16	.04	"	.08
6778	" 29	" 30	s	1	.01.03*	142.4	125.6	16.8	19.6	18.4	3.1	2.	1.9	.1	.002	.06	.054	.006	.144	.12	.024	"	.12
6830	Feb. 5	Feb. 6	s	1	.01.02*	132.	126.	6.	16.	11.6	3.	2.7	2.	.7	.002	.102	.096	.016	.176	.16	.016	"	.12
6931	" 19	" 20	s	1	.01.02*	132.	127.6	4.4	12.	10.	3.2	2.	1.9	.1	.002	.1	.096	.004	.184	.16	.024	"	.08
6980	" 26	" 27	s	1	.01.02*	141.2	125.6	15.6	19.6	10.4	3.2	2.4	2.3	.1	.002	.078	.074	.004	.184	.168	.016	"	.4
7014	Mar.	Mar. 6	s	1	.01.02*	142.4	141.2	1.2	15.6	14.8	3.2	2.	1.8	.2	.002	.08	.076	.004	.2	.176	.024	"	.2
7061	" 12	" 13	s	1	.02	146.8	133.2	13.6	8.8	5.6	3.5	2.1	2.1	..	.002	.064	.06	.004	.168	.16	.008	"	.32
7110	" 19	" 20	s	1	.01.02*	144.4	139.6	4.8	7.2	7.2	3.5	2.9	2.6	.3	.002	.088	.08	.008	.156	.14	.016	"	.2
7159	" 26	" 27	s	1	.01.02*	144.4	144.	.4	15.2	15.2	3.5	2.2	2.2	..	.002	.074	.068	.006	.252	.228	.024	"	.24
7212	Apr. 2	Apr. 3	s	1	.01.02*	145.6	132.4	13.2	10.	6.8	3.5	3.1	2.7	.4	.002	.082	.072	.06	.18	.14	.04	"	.2
7268	" 9	" 10	s	1	.01.02*	142.4	132.4	10.	14.8	12.8	3.4	2.9	2.3	.6	.002	.078	.072	.006	.156	.124	.032	"	.2
7319	" 16	" 17	s	1	.01.02*	133.6	127.2	6.4	19.6	18.	3.3	2.5	2.5	..	.002	.06	.054	.006	.196	.18	.016	"	.2
7394	" 23	" 24	s	1	.01.02*	145.2	131.6	13.6	6.8	5.2	3.5	2.1	2.1	..	.002	.078	.074	.004	.172	.14	.032	"	.4
7435	" 30	May 1	s	1	.01.02*	131.2	124.4	6.8	14.4	8.	3.6	2.4	2.4	..	.001	.068	.06	.008	.114	.1	.014	"	.28
7473	May 7	" 8	s	1	.01.02*	130.8	128.8	2.	23.8	22.	3.5	3.	2.6	.4	.004	.08	.076	.004	.194	.18	.014	"	.32
7521	" 14	" 15	s	1	.01.02*	132.	130.4	1.6	26.	24.8	3.5	2.9	2.5	.4	.022	.094	.086	....	.226	.21	.016	"	.2
7580	" 21	" 22	s	vl	.01.02*	143.2	134.	9.2	20.4	19.6	3.3	3.	2.9	.1	.042	.088	.068	.02	.132	.1	.032	"	.12
7611	" 28	" 29	s	1	.01.02*	130.8	125.6	5.2	26.4	23.6	3.6	2.8	2.8	..	.002	.068	.064	.004	.154	.146	.008	"	.16
7651	June 4	Jun. 5	s	1	.01.02*	144.8	139.6	5.2	32.	31.6	3.5	2.5	2.5	..	.002	.072	.058	.044	.186	.146	.04	"	.2
7697	" 11	" 12	s	1	.01.01*	130.	129.6	.4	20.	20.	6.8	2.9	2.7	.2	.002	.072	.068	.004	.17	.13	.04	"	.24
7732	" 18	" 19	vs	vl	.01.02*	139.2	138.8	.4	17.6	17.2	3.4				.044	.084	.056	.028	.104	.068	.036	.001	.16
7771	" 25	" 26	n	vl	.01.02*	158.	151.2	6.8	34.4	30.4	3.3	2.2	2.2	..	.006	.054	.054	....	.324	lost	....	none	.12
7814	July 2	July 3	vs	vl	.01	150.4	142.8	7.6	26.4	19.6	3.3	2.5	2.3	.2	.013	.074	.056	.018	.34	.308	.032	"	.28
7883	" 9	" 10	vs	vl	.01	139.6	137.2	2.4	14.8	13.6	3.4	2.3	2.2	.1	.012	.07	.07	....	.084	.084		trace	.12
7933	" 16	" 17	vs	vl	.02	152.	142.	10.	17.6	17.6	3.2	2.2	2.2	..	.012	.056	.056	....	.218	.194	.022	"	.12

CHEMICAL EXAMINATION OF WATER FROM LAKE MICHIGAN AT CHICAGO.—CONTINUED.
(Parts per 1,000,000.)

Serial Number.	1900 Date of Collection.	1900 Date of Examination.	Appearance. Turbidity.	Appearance. Sediment.	Appearance. Color.	Residue on Evaporation. Total.	Residue on Evaporation. Dissolved.	Residue on Evaporation. Suspended.	Residue on Evaporation. Loss on Ignition. Total.	Residue on Evaporation. Loss on Ignition. Dissolved.	Chlorine.	Oxygen Consumed. Total.	Oxygen Consumed. By Dissolved.	Oxygen Consumed. By Suspended Matt'r	Nitrogen as Ammonia. Free Ammonia.	Nitrogen as Ammonia. Albuminoid Ammonia. Total.	Nitrogen as Ammonia. Albuminoid Ammonia. Dissolved.	Nitrogen as Ammonia. Albuminoid Ammonia. Suspended	Organic Nitrogen. Total.	Organic Nitrogen. Dissolved.	Organic Nitrogen. Suspended	Nitrogen as Nitrites.	Nitrogen as Nitrates.
8004	July 23	July 24	s	vl	.01	143.6	138.8	4.8	16.4	11.6	3.1	2.	2.	..	.012	.058	.058	....	.122	.122	....	trace	.2
8056	“ 30	“ 31	d	vl	.01	131.2	120.8	10.4	20.8	14.8	3.	2.	2.	..	.006	.054	.054	....	.122	.122	....	none	.2
8104	Aug. 6	Aug. 7	vs	vl	.01	146.4	135.2	11.2	21.2	11.6	3.1	2.5	3.6	..	.024	.066	.064	.002	.146	.148	....	trace	.44
8163	“ 13	“ 14	vs	vl	....	144.	131.6	12.4	28.8	20.8	3.1	2.8	2.5	.3	.012	.07	.072	....	.162	.196	....	“	.68
8230	“ 20	“ 21	vs	l	.01	129.6	127.6	2.	16.8	13.6	4.	2.4	2.3	.1	.02	.07	.064	.006	.19	.172	.018	none	.16
8299	“ 27	“ 28	n	n	.01	140.4	134.8	5.6	11.6	9.6	3.1	2.6	2.4	.2	.028	.084	.08	.004	.15	.14	.01	“	.16
8354	Sept. 3	Sept. 4	c	vl	.01	142.	139.2	2.8	12.8	11.2	3.1	2.2	2.	.2	.04	.094	.16	....	.118	....	....	trace	.24
8427	“ 10	“ 11	vs	vl	.02.01*	124.	118.4	5.6	17.6	16.	3.1	2.4	2.3	.1	.016	.09	.096	....	.15	....	....	none	.24
8478	“ 17	“ 18	vs	vl	.01.01*	138.4	134.4	4.	26.4	15.6	3.2	2.6	2.4	.2	.044	.158	.096	.062	.38	.16	.22	“	.2
8534	“ 24	“ 25	c	vl	.01.02*	141.2	138.8	2.4	22.	18.4	3.2	2.2	....	..	.056	.178	.112	.066	.252	lost	....	“	.48
8588	Oct. 1	Oct. 2	c	vl	.02.03*	140.8	138.	2.8	20.8	19.2	3.2	2.6	2.4	.2	.042	.138	.112	.026	.216	.192	.024	“	.2
8641	“ 8	“ 9	vs	vl	.01.01*	137.2	130.4	6.8	15.2	12.	2.8	2.4	2.3	.1	.014	.108	.096	.012	.24	.352	....	.002	.28
8662	“ 15	“ 16	vs	vl	.01.01*	135.2	133.6	1.6	15.2	14.4	3.1	2.7	3.8	..	.008	.058	.064	....	.176	.224	....	.002	.318
8685	“ 22	“ 23	s	l	....	140.4	138.4	2.	16.8	15.6	3.1	2.3	2.1	.2	.044	.14	.072	.068	.2	.12	.08	.015	.265
8715	“ 29	“ 30	vs	vl	.01.01*	136.8	134.4	2.4	16.	15.2	3.	3.6	2.9	.7	.076	.144	.088	.056	.432	.288	.144	none	.52
8742	Nov. 5	Nov. 6	vc	vl	.01.01*	132.4	130.8	1.6	10.8	10.4	2.9	2.5	2.5	..	.104	.102	.08	.022	.144	.272	....	“	.24
8770	“ 12	“ 13	s	vl	.01.02*	130.4	130.4	0.0	10.8	10.	2.8	3.	3.	..	.047	.108	.136	....	.256	.352	....	“	.24
8800	“ 20	“ 21	s	vl	.01.02*	137.6	130.4	7.2	9.2	8.8	2.7	2.1	3.8	..	.046	.1	.12	....	.168	.184	....	“	.28
8824	“ 26	“ 27	s	l	.01.02*	140.4	127.2	13.2	16.	14.4	2.8	2.6	2.9	..	.018	.124	.048	.076	.184	.256	....	“	.16
8848	Dec. 3	Dec. 4	vs	vl	.01	126.	125.2	.8	12.8	12.	2.7	2.2	2.6	..	.024	.08	.078	.002	.144	.136	.008	trace	.24
8881	“ 10	“ 11	s	vl	.01.02*	139.6	131.2	7.4	12.8	11.6	2.7	2.8	3.	..	.008	.076	.068	.008	lost	.088	....	none	.08
8900	“ 17	“ 18	vs	vl	.01.01*	126.4	125.6	.8	8.	7.4	2.8	3.5	3.5	..	.014	.06	.06	....	.208	.168	.04	“	.26
8926	“ 26	“ 27	s	vl	.01.01*	130.	129.6	.4	16.	15.6	3.	2.5	3.3	..	.012	.08	.08	....	.112	.104	.008	“	.38
Average Jan. 4— Dec. 27						138.4	132.2	6.2	17.5	14.7	3.3	2.5	2.4	.17	.018	.085	.076	.014	.186	.155	.034	.004	.237

*Not filtered.

CHEMICAL EXAMINATION OF WATER FROM THE ILLINOIS RIVER AT KAMPSVILLE.
(Parts per 1,000,000.)

Serial Number.	1902 Date of Collection.	1902 Date of Examination.	Appearance. Turbidity.	Appearance. Sediment.	Appearance. Color.	Residue on Evaporation. Total.	Residue on Evaporation. Dissolved.	Residue on Evaporation. Suspended.	Residue on Evaporation. Loss on Ignition. Total.	Residue on Evaporation. Loss on Ignition. Dissolved.	Chlorine.	Oxygen Consumed. Total.	Oxygen Consumed. By Dissolved.	Oxygen Consumed. By Suspended Matt'r	Nitrogen as Ammonia. Free Ammonia.	Nitrogen as Ammonia. Albuminoid Ammonia. Total.	Nitrogen as Ammonia. Albuminoid Ammonia. Dissolved.	Nitrogen as Ammonia. Albuminoid Ammonia. Suspended	Organic Nitrogen. Total.	Organic Nitrogen. Dissolved.	Organic Nitrogen. Suspended	Nitrogen as Nitrites.	Nitrogen as Nitrates.
10173	Jan. 7	Jan. 9	d	vl	.1.3*	241.6	242.	....	27.2	29.6	20.	7.4	6.	1.4	1.68	.272	.256	.016	....	....	....	.015	1.025
10182	" 13	" 14	d	l	.1.2*	231.6	231.6	....	9.6	10.4	18.	7.2	6.8	.4	1.472	.32	.24	.08	....	....	....	.02	1.42
10196	" 20	" 21	d	l	.2.3*	312.	256.	56.	79.6	18.	19.	6.7	6.6	.1	1.6	.288	.24	.044	....	....	....	.017	1.423
10224	" 28	" 29	d	vl	.05.2*	263.6	256.4	7.2	30.	26.8	19.	7.4	lost	...	1.024	.304	.24	.064	....	....	....	.016	.864
10239	Feb. 3	Feb. 4	d	vl	.2.2*	250.	244.	6.	23.6	20.4	22.	7.5	7.3	.2	1.76	.32	.24	.08	....	....	....	.016	.864
10271	" 10	" 11	s	vl	.2.2*	252.8	239.2	13.6	22.	24.	21.	6.9	6.	.9	2.32	.224	.224	....	....	....	....	.015	.625
10278	" 18	" 19	s	vl	.05.05*	252.	248.4	3.6	18.8	18.8	20.	7.4	7.7	...	1.2	.272	.242	.03	....	....	....	.015	.625
10288	" 24	" 28	vs	vl	.05.05*	234.8	234.	.8	9.6	17.8	18.7	6.7	6.2	.5	2.16	.256	.192	.064	....	....	....	.013	.587
10293	Mar 3	Mar. 4	vd	m	‡	398.8	228.	170.8	41.6	19.2	16.	10.7	7.5	3.2	1.44	.336	.224	.112	....	....	....	.015	.545
10310	" 10	" 11	vd	m	‡	327.6	210.	117.6	25.6	23.6	14.	13.6	9.1	4.5	.64	.48	.288	.192	....	....	....	.016	.724
10319	" 17	" 18	vd	m	‡	604.	232.6	368.4	46.8	31.2	8.5	17.2	10.7	6.5	.704	.528	.224	.304	....	....	....	.03	1.57
10331	" 24	" 25	d	m	.3	314.8	244.8	70.	27.6	27.6	9.85	14.1	8.6	5.5	.64	.32	.256	.064	....	....	....	.07	2.33
10340	" 30	Apr. 1	d	m	.3	380.	247.6	32.4	27.6	27.6	9.1	13.6	9.2	4.4	.336	.384	.24	.144	....	....	....	.07	2.97
10347	Apr. 7	" 8	d	c	.3	400.	257.2	142.8	34.	33.2	9.3	15.3	9.4	5.9	.096	.56	.288	.272	....	....	....	.03	2.21
10352	" 14	" 15	d	c	.3	313.6	269.6	44.	33.6	40.8	10.1	12.2	9.3	2.9	.128	.4	.24	.16	....	....	....	.055	1.205
10361	" 21	" 22	d	c	.2	334.8	277.2	57.6	45.2	46.8	9.7	12.	7.8	4.2	.096	.384	.256	.128	....	....	....	.045	1.955
10370	" 28	" 29	d	c	.15	364.8	270.4	94.4	39.2	40.	10.	13.3	13.2	1.1	.104	.432	.256	.176	....	....	....	.036	1.324
10387	May 5	May 6	vd	m	.1	594.8	254.	340.8	35.6	31.2	10.9	15.8	9.5	6.3	.16	.416	.224	.192	....	....	....	.055	.905
10395	" 11	" 13	d	c	.2	473.6	279.6	194.	28.4	28.4	13.5	12.	8.	4.	.128	.336	.224	.112	....	....	....	.15	1.65
10401	" 19	" 21	vd	m	‡	543.2	278.8	264.4	42.4	34.	11.2	13.8	8.1	5.1	.064	.368	.192	.176	....	....	....	.1	1.74
10418	" 26	" 27	d	m	.2	536.	249.2	286.8	50.	38.4	9.5	13.1	7.7	5.4	.104	.352	.224	.128	....	....	....	.1	1.3
10431	June 2	June 3	d	c	‡	528.8	314.	214.8	57.6	34.	10.	13.7	8.7	5.	.06	.368	.256	.112	....	....	....	.08	1.72
10444	" 9	" 10	d	m	.4	458.4	247.2	211.2	38.4	15.2	10.	14.1	8.8	5.3	.056	.336	.272	.064	....	....	....	.05	1.95
10463	" 16	" 17	vd	vm	‡	868.4	236.8	631.6	70.	24.	6.2	19.6	8.5	11.1	.038	.72	.288	.432	....	....	....	.022	1.298
10472	" 23	" 24	vd	m	.6	478.	243.2	234.8	43.2	43.2	6.9	13.5	9.1	4.4	.08	.368	.36	.008	....	....	....	.042	1.428
10490	" 30	July 1	d	m	.3	842.8	191.6	651.2	64.8	48.	5.3	17.3	9.2	8.1	.108	.312	.224	.088	....	....	....	.03	.77
10494	July 7	" 8	d	c	‡	428.4	243.2	185.2	38.	35.2	5.8	13.6	11.2	2.4	.108	.368	.304	.064	....	....	....	.048	.823

CHEMICAL EXAMINATION OF WATER FROM THE ILLINOIS RIVER AT KAMPSVILLE.—CONTINUED.

(Parts per 1,000,000.)

Serial Number.	1902 Date of Collection.	1902 Date of Examination.	Appearance. Turbidity.	Appearance. Sediment.	Appearance. Color.	Residue on Evaporation. Total.	Residue on Evaporation. Dissolved.	Residue on Evaporation. Suspended.	Residue on Evaporation. Loss on Ignition. Total.	Residue on Evaporation. Loss on Ignition. Dissolved.	Chlorine.	Oxygen Consumed. Total.	Oxygen Consumed. By Dissolved.	Oxygen Consumed. By Suspended Matt'r	Nitrogen as Ammonia. Free Ammonia.	Nitrogen as Ammonia. Albuminoid Ammonia. Total.	Nitrogen as Ammonia. Albuminoid Ammonia. Dissolved.	Nitrogen as Ammonia. Albuminoid Ammonia. Suspended	Organic Nitrogen. Total.	Organic Nitrogen. Dissolved.	Organic Nitrogen. Suspended	Nitrogen as Nitrites.	Nitrogen as Nitrates*
10511	July 21	July 22	. .	. .	. .	242.4	199.6	42.8	28.4	27.2	4.8	9.9	8.3	1.6	.068	.288	.224	.064	....	....	....	.045	.675
10520	" 28	" 29	d	c	‡	252.4	213.6	38.8	35.6	23.2	4.4	10.3	8.1	2.2	.084	.304	.304	....	....	....	....	.048	.595
10532	Aug. 4	Aug. 5	. .	. .	.5	321.6	198.4	122.2	38.	36.4	4.45	11.3	10.8	.5	.076	.32	.24	.08	....	....	....	.016	.564
10544	" 11	" 12	d	c	.3	265.2	200.	65.2	44.4	35.6	4.3	10.2	10.	.2	.064	.304	.256	.048	....	....	....	.024	4.576
10565	" 19	" 21	d	c	‡	716.8	222.	494.8	68.	36.8	3.5	15.5	9.1	16.4	.52	.596	.24	.356	....	....	....	.065	.815
10572	" 25	" 26	d	m	.4	292.	209.2	82.8	40.8	37.2	4.8	10.1	8.8	1.4	.04	.272	.16	.112	....	....	....	.042	.638
10593	Sept. 1	Sept. 2	d	c	.3	331.2	234.4	96.8	30.4	32.8	5.8	9.8	8.9	.9	.084	.256	.192	.064	....	....	....	.024	.616
10606	" 8	" 10	d	c	.2	424.4	268.4	156.	32.	39.2	8.25	11.5	8.3	3.2	.084	.304	.224	.08	....	....	....	.05	.63
10621	" 15	" 16	d	c	.1	376.	271.2	104.8	48.	46.8	9.7	9.7	7.5	2.2	.064	.304	.208	.096	....	....	....	.05	.59
10657	" 30	Oct. 1	d	m	.2	454.8	230.8	224.	46.8	29.2	9.4	10.8	6.8	4.	.072	.336	.144	.192	....	....	....	.125	.755
10685	Oct. 6	" 10	d	c	.1	470.8	228.8	242.	58.	38.8	7.6	12.	8.4	3.6	.064	.352	.224	.128	....	....	....	.065	.895
10700	" 13	" 14	d	c	‡	496.	339.6	156.4	23.2	28.8	7.8	14.	7.8	6.2	.044	.288	.252	.036	....	....	....	.03	1.01
10709	" 20	" 21	d	c	.4	373.6	259.2	113.4	48.	48.	7.4	9.1	6.3	2.8	.056	.368	.192	.176	....	....	....	.018	.942
10718	" 27	" 28	d	c	.2	396.4	266.8	129.6	54.	44.	6.8	8.9	6.2	2.7	.08	.288	.144	.144	....	....	....	.022	.858
10739	Nov. 3	Nov. 4	d	c	.2	380.4	306.4	74.	44.	45.2	7.5	7.5	6.3	1.2	.132	.272	.192	.08	....	....	....	.02	.82
10754	" 10	" 12	d	c	.2	410.	387.6	122.4	54.8	22.2	7.4	7.8	6.4	1.4	.112	.24	.208	.032	....	....	....	.004	.84
10760	" 17	" 18	d	c	.2	497.6	277.2	220.4	42.8	24.8	8.2	7.4	6.8	.6	.1	.192	.16	.032	....	....	....	.02	1.18
10773	Dec. 1	Dec. 2	d	l	.2	338.4	308.4	30.	52.8	43.6	8.8	6.7	6.	.7	.072	.192	.16	.032	....	....	....	.016	1.264
10792	" 9	" 10	d	l	.2	312.8	308.8	4.	31.2	29.6	9.	6.3	6.2	.1	.136	.256	.192	.064	....	....	....	none	1.2
10812	" 22	" 24	d	m	‡	282.8	256.	26.8	24.8	16.4	8.1	12.6	7.7	4.9	.248	.496	.128	.368	....	....	....	.008	1.232
10827	" 29	" 30	d	m	.1	511.2	334.	177.2	59.6	58.	9.2	13.7	7.	6.7	.32	.528	.288	.24	....	....	....	.01	1.99
Average Jan. 7—June 30						423.1	249.8	173.3	37.4	28.9	12.9	12.	8.3	3.7	.699	.371	.246	.125	....	....	....	.043	1.347
Average July 7—Dec. 29						389.7	260.6	129.1	42.8	35.4	6.9	10.4	7.8	2.6	.119	.323	.211	.112	....	....	....	.035	1.068
Average Jan. 3—Dec. 27						407.8	254.7	153.1	39.9	32.3	10.2	11.3	8.1	3.2	.433	.349	.23	.119	....	....	....	.039	1.219

Until the middle of May the water possessed a faint musty odor, after that date in was odorless until December, when it again became musty. The color upon ignition was almost invariably brown; twice in January it was gray.

*Not filtered. ‡Muddy.

CHEMICAL EXAMINATION OF WATER FROM THE ILLINOIS RIVER AT GRAFTON.
(Parts per 1,000,000.)

Serial Number.	1902 Date of		Appearance.			Residue on Evaporation.					Chlorine.	Oxygen Consumed.			Nitrogen as Ammonia				Organic Nitrogen			Nitrogen As	
	Collection	Examination	Turbidity.	Sediment.	Color.	Total.	Dissolved.	Suspended.	Loss on Ignition. Total.	Loss on Ignition. Dissolved.		Total.	By Dissolved.	By Suspended Matt'r	Free Ammonia.	Albuminoid Ammonia. Total.	Albuminoid Ammonia. Dissolved.	Albuminoid Ammonia. Suspended	Total.	Dissolved.	Suspended	Nitrites.	Nitrates.
10219	Jan. 27	Jan. 28	d	l	.05	265.2	258.4	6.8	30.	36.4	18.	8.9	8.5	.4	1.44	.304	.288	.016	....	....	....	.012	.908
10284	Feb. 24	Feb. 25	s	n	.1	253.6	246.4	7.2	22.	21.6	17.	6.3	7.2	...	1.6	.224	.208	.16	....	....	....	.012	.548
10332	Mar. 25	Mar. 26	d	c	.3	358.8	241.2	117.6	26.8	25.6	8.8	12.1	9.7	2.4	.608	.352	.304	.048	....	....	....	.055	2.345
10373	Apr. 28	Apr. 29	d	c	.15	478.4	277.2	201.2	47.2	44.4	10.6	14.2	9.3	4.9	.136	.496	.256	.24	....	....	....	.042	1.558
10419	May 26	May 28	d	c	.2	353.2	236.8	116.4	46.	44.8	10.1	10.1	7.3	2.8	.044	.288	.192	.096	....	....	....	.095	1.345
10478	Jun. 26	Jun. 27	d	c	.4	382.8	247.6	135.2	28.	26.8	7.	13.3	11.2	2.1	.048	.336	.256	.07	....	....	....	.02	.78
10526	July 28	July 30	d	c		337.2	215.2	122.	40.8	39.6	4.7	....	9.8	...	.056	.336	.272	.064	....	....	....	.04	.64
10579	Aug. 27	Aug. 28	d	c		334.	215.6	118.4	34.4	21.6	5.1	10.3	8.3	2.	.096	.288	.224	.064	....	....	....	.012	.628
15645	Sep. 26	Sep. 27	Vd	m		550.4	234.8	315.6	43.2	32.4	10.4	13.4	7.4	6.	.072	.384	.192	.192	....	....	....	.05	.59
10719	Oct. 28	Oct. 29	d	c		529.6	303.6	226.	45.2	45.2	6.4	9.	6.1	2.9	.112	.32	.144	.176	....	....	....	.022	.778
10770	Nov. 28	Nov. 29	d	c		350.4	300.	50.4	50.8	44.4	8.	7.7	6.3	1.4	.096	.224	.192	.032	....	....	....	.012	1.188
10825	Dec. 26	Dec. 30	d	m		467.6	281.6	186.	52.8	53.6	6.6	11.9	5.5	6.4	.24	.32	.224	.096	....	....	....	.014	1.586
Average Jan. 27 — Dec. 26						348.6	251.3	97.3	33.3	33.2	11.9	10.8	8.86	2.5	.646	.333	.251	.082	....	....	....	.039	1.247
Average July 28 — Dec. 26						428.4	258.4	169.8	44.5	39.4	6.8	10.4	7.2	3.7	.112	.312	.208	.104	....	....	....	.025	.901
Average Jan. 27 — Dec. 26						388.4	354.8	133.6	38.9	36.3	9.3	10.6	8.1	3.1	.379	.322	.229	.093	....	....	....	.032	1.074

ERRATA.

ERRATA.*

Page 119—

Aver. Jan. 5-June 22; Free Ammonia, for .7 read 2.704.

Page 121—

In Heading, for Ottawa read Morris.
Aver. Jan. 3-Sept. 24; Total Albuminoid Ammonia. for 1.39 read .856.
Aver. Jan. 3-Sept. 24; Total Organic Nitrogen, for 2.49 read 1.672.

Page 137—

Aver. April 26-June 28; Nitrites, for .265 read .165.

Page 140—

Serial No. 3631; Nitrates, for 8.5 read .85.
Serial No. 3775; Nitrates for 5. read .5.

Page 141—

Aver. Jan. 4-Dec. 26; for Jan. 4 read Jan. 3.

Page 143—

Serial No. 8597; Nitrates for 4.28 read 1.28.
Serial No. 8645; Chlorine, for 2.3 read 23.
Serial No. 8697; Nitrates, for 4.44 read 1.41.
Serial No. 8775; Nitrates, for .1 read 1.9.
Serial No. 8794: Nitrates, for 1.544 read 1.044.
Aver. July 3-Dec. 24; Nitrates, for 4.354 read 1.423.
Aver. Jan. 2-Dec. 24; Nitrates, for 1.584 read 1.602.
Aver. Jan. 2-Dec. 24; Dissolved Organic Nitrogen, for .593 read .534.

Page 151—

Aver. Jan. 11-June 13; By Dissolved Oxygen Consumed, for 3.4 read 7.8.
Aver. Jan. 11-June 13; By Suspended Oxygen Consumed, for 7.8 read 3.4.
Aver. Jan. 11-Dec. 24; Total Oxygen Consumed, for 6.6 read 8.7.
Aver. Jan. 11-Dec. 24; By Dissolved Oxygen Consumed, for 4.5 read 6.8.
Aver. Jan. 11-Dec. 24; Nitrites, for .024 read .0701

Page 153—

Aver. Jan. 12-June 29; Suspended Organic Nitrogen, for .35 read .46.
Aver. July 6-Dec. 28; Total Organic Nitrogen, for .88 read 1.009.
Aver. Jan. 12-Dec. 28; Total Organic Nitrogen for 1.24 read 1.09.
Aver. Jan. 12-Dec. 28; Dissolved Organic Nitrogen, for .69 read .705.
Aver. Jan. 12-Dec. 28; Suspended Organic Nitrogen. for .55 read .385.

Page 155—

Aver. Jan. 4-June 28; Free Ammonia, for .462 read .51.

Page 160—

Serial No. 5453; Chlorine. for 13.9 read 12.9.

Page 161—

Aver. Dec. 31-June 28; Nitrates, for 1.092 read 1.02.
Aver. July 5-Dec. 27; Total Organic Nitrogen, for .999 read 1.035.
Aver. Dec. 31, '98-Dec. 27 '99; Total Albuminoid Ammonia, for .479 read. 489.
Aver. Dec. 31, '98-Dec. 27, '99; Nitrates, for 1.063 read 1.027.

Page 165—

Aver. July 5-Dec. 20; Total Albuminoid Ammonia, for .34 read .382.
Aver. July 5-Dec. 20; Dissolved Albuminoid Ammonia for .18 read .21.
Aver. July 5-Dec. 20; Total Organic Nitrogen for .83 read .922.
Aver. July 5-Dec. 20; Dissolved Organic Nitrogen, for .4 read .465.
Aver. July 5-Dec. 20; Suspended Organic Nitrogen for .41 read .457.
Aver. Dec. 31, '98-Dec. 20 '99; Total Albuminoid Ammonia, .487 read .508.
Aver. Dec. 31, '98-Dec. 20, '99; Dissolved Albuminoid Ammonia, for .204 read .217.
Aver. Dec. 31, '98-Dec. 20, '99; Suspended Albuminoid Ammonia for .283 read .291.
Aver. Dec. 31 '98-Dec Total Organic Nitrogen, for 1.122 read 1.168.
Aver. Dec. 31 '98-Dec. 20, '99; Dissolved Organic Nitrogen, for .452 read .485.
Aver. Dec. 31, '98-Dec. 20, '99; Suspended Organic Nitrogen, for .655 read .683.

Page 167—

Aver. Jan. 4-Dec. 24; Chlórine, for 3.1 read 3.135.

Page 173—

Aver. Jan. 5-June 28; Dissolved Albuminoid Ammonia, for .284 read .241.
Aver. Jan. 5-June 28; Suspended Albuminoid Ammonia for .339 read .382.
Aver. Jan. 5-Dec. 20; Dissolved Albuminoid Ammonia. for .263 read .241.
Aver. Jan. 5-Dec. 20; Dissolved Albuminoid Ammonia, for .25 read .272.

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*These and other errata have been eliminated from the averages in Tables III to XVII, Pages 67-99.

Page 175—

Aver. Jan. 5-June 28; Nitrites, for .037 read .027.
Aver. Jan. 5-Dec. 20; Nitrites, for .025 read .02.

Page 177—

Aver. Jan. 5-Dec. 20; Free Ammonia, for .275 read .141.

Page 179—

Aver. July 5-Dec. 20; Nitrates, for .15 read .25.
Aver. Jan. 5-Dec. 20; Nitrates, for. 35 read .4.

Page 181—

Aver. Jan. 5-Dec. 20; Nitrites, for .143 read .012
Aver. Jan. 5-Dec. 20; Nitrates, for .2 read .4.

Page 182—

Serial No. 7296; Chlorine. for 3.3 read 5.
Serial No. 7632; Chlorine, for 4. read 7.5.

Page 190—

Serial No. 7629; Chlorine, for 7.5 read 4.

Page 193—

Aver. July 8-Dec. 30; Free Ammonia, for 3.1 read 21.
Aver. Jan. 22-Dec. 30; Free Ammonia, for 6.8 read 17.6.

Page 195—

Aver. Jan. 22-June 11; Nitrites, for .023 read .014.
Aver. July 8-Dec. 30, Nitrites, for .068 read .016.
Aver. Jan. 22-Dec. 30; Nitrites, for .031 read .023.

Page 202—

Serial No. 9206; Nitrites, for .8 read .08.

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Aver. July 1-Dec. 30; Nitrites, for .092 read .062.
Aver. Jan. 7-Dec. 30; Nitrites for .061 read .044.

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Serial No. 9004; Free Ammonia, for 1. read .76.
Serial No. 9078; Free Ammonia, for .92 read .092.

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Aver. Feb. 21-June 25; Free Ammonia, for .517 read .304.
Aver. Feb. 21-Dec. 23; Free Ammonia, for .279 read .182.

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Serial No. 1942; Nitrites, for .17 read .017.

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Aver. Feb. 15-June 28; Nitrites, for .027 read .019.
Aver. Feb. 15-June 28; Nitrates, for .91 read .57.
Aver. Feb. 15-Dec. 27; Nitrates, for .55 read .41

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1st Average, for Jan. 5 read June 5.

Page 217—

Serial No. 8514: Total Organic Nitrogen, for 1.584 read 1.364.
Aver. Jan. 1-Dec. 19; Free Ammonia, for .731 read .066.

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Serial No. 3352; Free Ammonia, for .38 read .318.

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Aver. Jan. 3-Dec. 27; Total Albuminoid Ammonia, for .191 read .091.

Page 235—

Serial No. 5993; Chlorine, for 7. read 6.2.

Page 239—

Serial No. 10565: Free Ammonia, for .52 read .052.
Serial No. 10565; Nitrates. for 4.576 read, 516.
Serial No. 10754 Nitrites, for .001 read .04.
Aver. July 7-Dec. 29; Free Ammonia, for .119 read .098.
Aver. Jan. 3-Dec. 27; Free Ammonia. for .433 read .424.

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Aver. Jan. 27-Dec. 26, for Dec. 26 read June 26.

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